

hp-ux/usr

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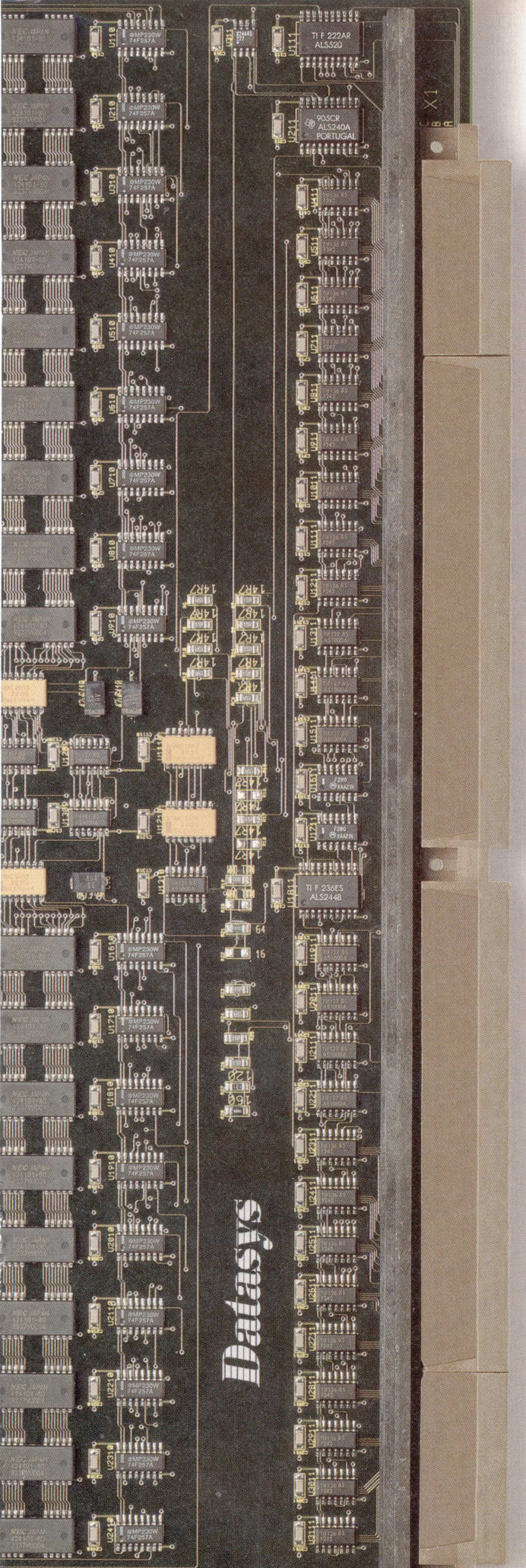
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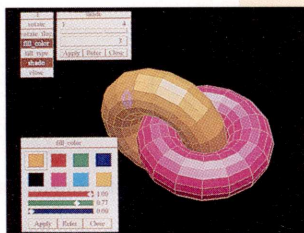
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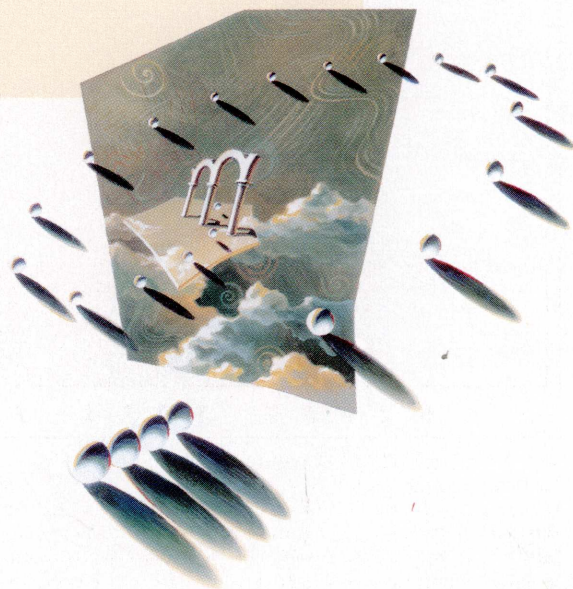
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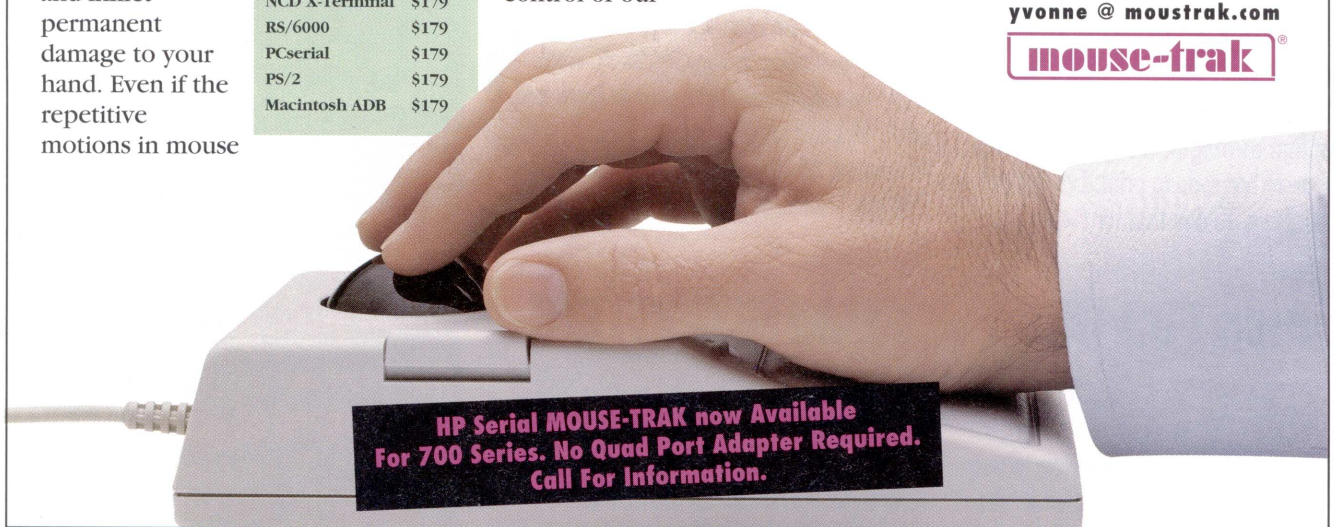
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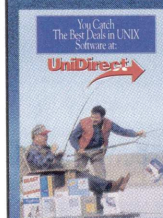
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hp-ux/usr is published bimonthly by Interex, the International Association of Hewlett-Packard Computer Users. Third-class postage paid at Sunnyvale, California 94086 and additional offices. The editorial and business offices are located at 1192 Borregas Ave., Sunnyvale, California 94089, USA, (408) 747-0227, Fax (408) 747-0947. Address membership questions and change of address to Membership Services. Address all questions concerning circulation/distribution to the Distribution Manager.

Remittances should be sent to Interex,
File No. 61054, P. O. Box 60000,
San Francisco, California 94160, USA.

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Letters

THERE IS A SLIGHT PROBLEM in the "Real-time Logins" tip of the HP-UX Systems Administration Column of July 1993 *hp-ux/usr*. I stumbled on the problem the hard way; perhaps you should alert other readers before they make the same mistake.

The first step suggested in the article is to place the command:

```
/etc/setprivgrp -g RTPRIO
```

in */etc/rc*. By default */etc/setprivgrp* removes all privileges not explicitly set rather than adding to the list; therefore the above command removes the global privilege CHOWN. Taking away CHOWN permission is a good way to get a system administrator's phone ringing! To fix the problem the command should be:

```
/etc/setprivgrp RTPRIO CHOWN.
```

John W. Jackson
System Administrator
Technical Information System
Special Metals Corporation
New Hartford, New York

Chris Curtin Responds:

Thank you for the feedback. Since I had never had this problem before, I investigated why the permissions were being reset. A comment in the man page for *setprivgrp* (1M) says that all permissions for a group must be specified each time the *setprivgrp* command is used. It appears that the CHOWN permission is given by default to all groups and that using the *setprivgrp* clears this default.

I am also assuming that you meant:

```
/etc/setprivgrp -g RTPRIO CHOWN
```

(I added the -g option; otherwise a group named 'RTPRIO' would be given CHOWN permission ;-)

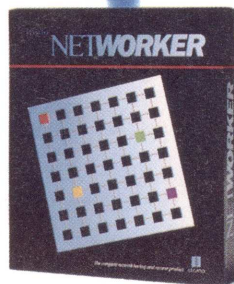
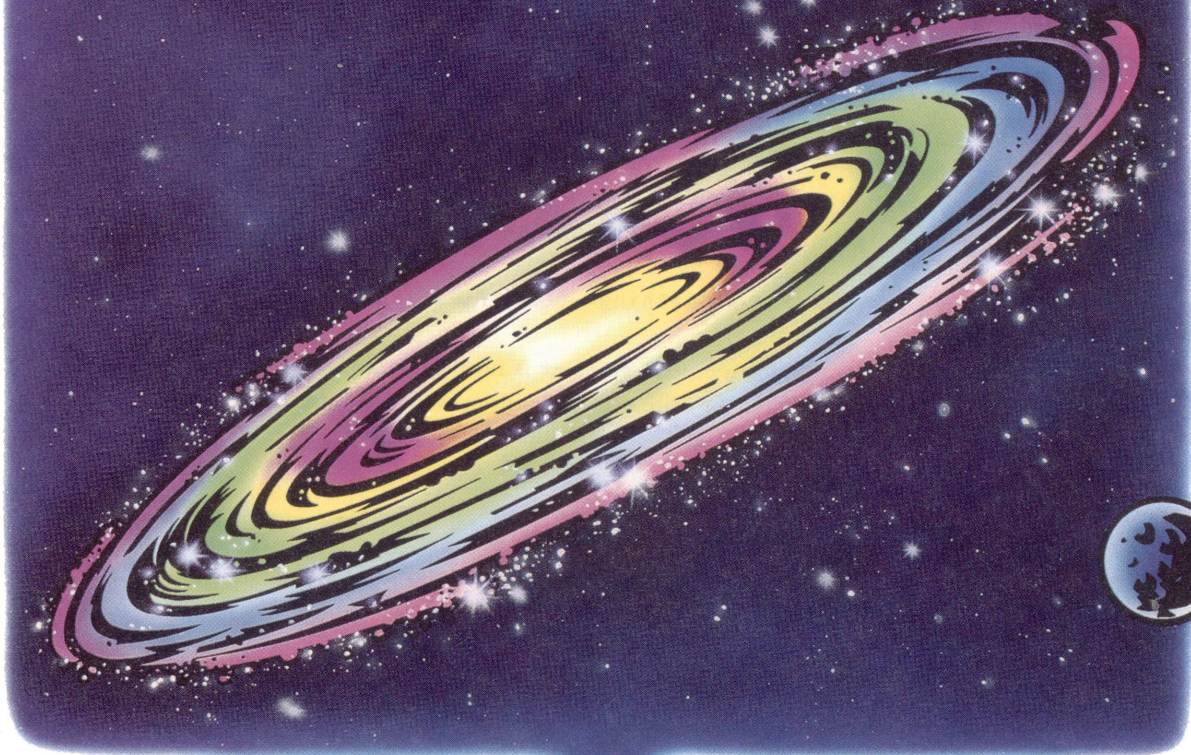
Thanks,
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Question & Answer

Q: How do you search in a man page?

A: The man command simply sends everything out to something like the more command, so searching or moving back up through the text is a problem.

One way is to create an ASCII-only file of the man page:

```
man <something> | col -b > /tmp/manpage
```

The file */tmp/manpage* is now a simple file that you can browse using vi or any other favorite editor. Another way is to script this process and create a command like viman:

```
#!/bin/sh
#
# Copy the man page to a temp file, then run vi on it.
#
TMP=/usr/tmp/.myman$$
rm -rf $TMP
man $1 | col -b | unexpand -a > $TMP
if [ -s $TMP ]
then
    vi $TMP
fi
rm -f $TMP
```

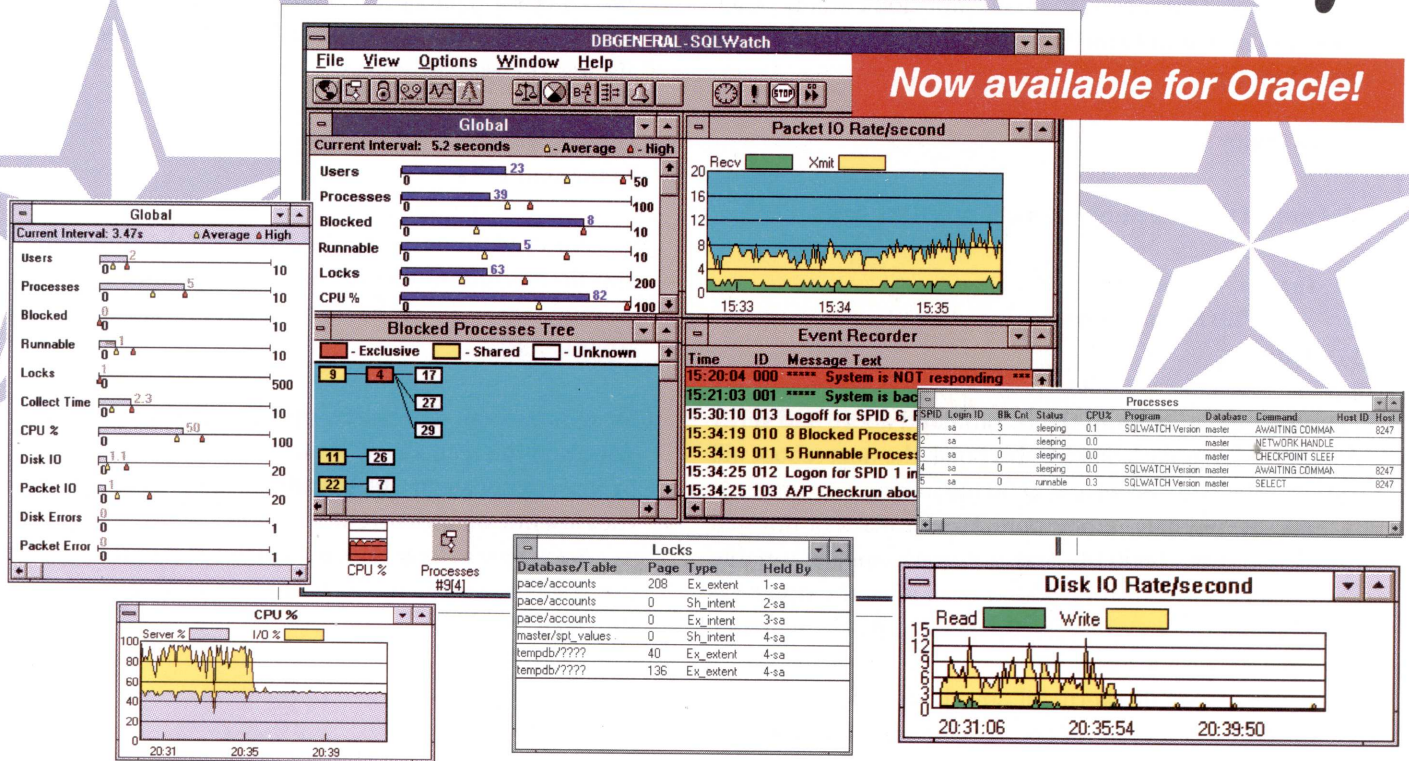
This will pop you into vi with a copy of the entire man page. Now you can use the search commands in vi to bounce around the text. The `col -b` command is used to remove the special characters (like backspace) and unexpand reduces the size of the text by using tabs.

Q: I'm about to upgrade my 800 Series computer to 9.0...what should I know in preparation to the update?

A: Although update is pretty robust in handling the many, many configurations possible in HP-UX, there are some times where a little front-end work to simplify the system will save hours during the update procedure. Before you do the upgrade, look at the Readme First documentation and then verify that all the applications you are currently running are compatible with the 9.0 operating system. Look carefully at whether you need to change to LVM—it will require many additional steps if you decide to convert from sectioning to LVM.

Plan on reserving a weekend for the update, and be sure to perform a full backup prior to the update. Also read the *9.0 Installation/Update* manual and check specifically on the disk space requirements. You'll need to provide the extra disk space before proceeding.

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1. The first step is to make sure that the kernel configuration file in `/etc/conf/gen/S800` is the current version of the running kernel. This means that you must look at any other S800 files in that directory and choose the one you wish to use. Then type

```
uxgen S800
```

and note if there are any errors. If not, then type:

```
mv /hp-ux /SYSBACKUP
mv ../S800/hp-ux /hp-ux
ll /hp-ux
```

Look at the output from the `ll` command above and verify that `/hp-ux` has today's date. At this point, the next reboot will have the current kernel and S800 file in sync.

It's also important to remove non-standard or unusual drivers from the S800 file and to remove special tunable parameters. These can be added back after the update is complete, but be sure that the driver or tunable parameter is supported (will work) at 9.0.

Again, regen the kernel if any changes were made to the S800 file, and then reboot. It is important to have the S800 file and the currently running kernel match to prevent problems later on.

2. Now it's time to boot into single user mode. Note: single user mode is NOT `init s`, but the command:

```
/etc/shutdown 0
```

Using `init s` just changes the run level but doesn't clean up daemons and processes that aren't monitored by `init`.

Just to make sure all is well, run `fsck` (no parameters needed) to go over all the disks listed in `checklist` to make sure there is no hidden directory corruption.

Now mount `/usr` (you can just type `/etc/mount /usr`—no need to give the entire path). If `/usr` isn't a separate disk on your system, then `mount` will complain that `/usr` is not found in `/etc/checklist`. No problem, but you need `/usr` to get the system ready for update.

Now run `vi` to edit `checklist`. Place a `#` character (comment) in front of every line that is not a system disk. This includes all CD-ROM's, database disks, NFS mountpoints,

and file system swap entries (device swap can remain uncommented). In general, `checklist` should have only `root (/)` and `/usr` (if it is a separately mounted file system). Directories such as `/users` are not needed during the opsystem update.

To test `/etc/checklist`, type:

```
/etc/umount -a
/etc/mount -a
```

This will unmount all disks (except the root volume) and then remount everything in `checklist` that is not commented, which should be the root volume and `/usr`, if it is a separate disk.

3. Most important: do not run update unless it is the 9.0 version! Now this seems to be a catch-22 ... you need 9.0 update in order to update to 9.0! Actually, the next version of update runs just fine on the current version of the operating system.

So, what you must do is to load the TOOL file set. To do this, load the update media (CD-ROM, DDS tape, etc.) into the drive and then:

```
cd / ← important
```

For tapes:

```
tar xvf /dev/rmt/0m
```

For CD-ROM:

```
mount /dev/rdisk/<name_of_disk> /cdrom
tar xvf /cdrom/TOOL
```

Note the capital letters `TOOL` for the CD-ROM. The above action loads the 9.0 update file set onto your system. Note that this version of update will work fine on your 8.0x system so this step could be done days in advance of the actual update.

To make troubleshooting easier, move the current `update.log` file to another name as in:

```
mv /tmp/update.log /tmp/update.oldlog
```

Now the new log contains only the results of the 9.0 update steps.

4. Now it's time to do the update. We're still in single user mode with the `/usr` disk mounted. When update gets started, it will ask you if you want to load all file sets. I always skip this choice and go to the Select/View Partitions and File sets ... selection. Highlight this section and press Return to see just what is on the update media.

Normally you will want to load everything, or perhaps load only that which is already on your system, but look at the list and verify the file sets that will be loaded.

Once the file sets are selected, press the Perform Task key and the rest of the update should go without a problem. The system will be automatically rebooted part way through the update and once completed, it will return back to multi-user mode where you can log in.

If you have users who may log in over the network or through modems or other access ports, I would do another `/etc/shutdown 0` to return to single user mode. There are still some additional tasks to do.

5. Verify that the autoboot file is correct for your system. To do this, type:

```
lifcp /dev/rdisk/c0d0s6:AUTO -
```

NOTE: `c0d0s6` must be the location of your boot disk. If you are running LVM, use the command `vgdisplay -v` to determine the `/dev/rdisk/...` for your root volume; it might be `c1d0s6` or `c2d0s6`, etc. Note the dash at the end of the command line.

The result of this command is to display the contents of the autoboot file. For 9.0, it should read:

```
hpux (;0)/hp-ux
```

If it reads something else, you'll need to change it to ensure that system boots up automatically. To save typing, I've set the variable `MyDisk` to the device file. Here are the steps:

```
MyDisk=/dev/rdisk/c0d0s6
lifcp $MyDisk:AUTO /tmp/auto
vi /tmp/auto
```

...make the changes needed on this one-line file and save it...

```
Lifrm $MyDisk:AUTO
```

```
lifcp -r -K2 -T-12289 /tmp/auto $MyDisk:AUTO
lifcp $MyDisk:AUTO /tmp/auto
```

The last step reports back the new autoboot file, which should match the `hp-ux` text mentioned above.

6. Check the configuration files in `/etc/newconfig` with their equivalents in `/etc`. File such as:

```
bootptab csh.login gettydefs inetd.conf inittab magic master
profile services...etc.
```

may need to be compared to see if there are new features added at 9.0 that should be incorporated into the pre-9.0 files. Also check every file that ends with `rc` as in:

```
ll /etc/*rc
```

and compare these with `/etc/newconfig/*rc`.

7. `/etc/netnfsrc` has changed format and the mechanism to start NFS is now to change the line:

```
START_MOUNTD=0
```

to read:

```
START_MOUNTD=1
```

Now this is a choice. If you currently start the NFS mount daemon from `inetd` (i.e., `inetd.conf` has a line to start `rpc.mountd`), then leave `netnfsrc` with `START_MOUNTD=0`. Don't start the mount daemon in both places.

8. A new feature in 9.0 (for NFS) is the `/etc/exportfs` command. This allows much finer control over the access to NFS mounted directories, but it may require making changes to the `/etc/exports` file, and running the `/etc/exportfs` command. Check the man pages for `exportfs`.

9. If you did not have a mail aliases file (`/usr/lib/aliases`), be sure to copy the reference version from `/etc/newconfig/aliases` to `/usr/lib`.

Be sure there are entries for:


```
MAILER-DAEMON : root
postmaster    : root
Postmaster    : root
nobody        : /dev/null
operator      : root
uucp          : root
daemon       : root
lp            : root
```

You may elect to send the generic system mail such as postmaster to another user. For details on the aliases file, check the man page on sendmail.

10. Check `/etc` and `/bin` for files that start with a `#` character. These are files that have been replaced, but a copy of the old file has been kept for reference. If they are ASCII files, use the `diff` command to compare the two and determine if some of the differences need to be included in the new version of the file.

This is a lot of information, but it will save a lot of false starts in getting your system updated.

Bill Hassell is an HP-UX system support engineer at the HP Atlanta Response Center. He can be contacted at his e-mail address, which is blh@hpuerca.atl.hp.com.

Workstations

Q: I have just installed the HP 9000 fax software and my Everex 24/96E modem. I am able to use the modem via the `cu` command and dial out. However, when I start the fax processes the Transmit Ready (TR) light does not come on. Looking at the file `/usr/spool/fax/log`, I can see that the process fax-listen reported that the command

```
AT+FCLASS=2
```

was rejected. Why am I getting this error?

A: The modem is not functioning correctly because it is not a class 2-compliant modem and therefore is not compatible with the HP 9000 fax software. The two Everex modems that are supported are

Everex 24/96D EXO-000967-02

and

Everex 24/96E EXO-000967-02

where the “-02” indicates that the modem is class 2-compliant. You can confirm that your Everex modem is a class 2-compliant modem by connecting directly to the modem using the `cu` command and issuing the command:

```
ATi4
```

If the modem is a class 2-compliant modem, you should see the string

```
EV967-02
```

If you see the string

```
EV967-00
```

you will need to replace or upgrade your modem.

Q: Is there a function in BASIC/WS 6.2 that returns the address used with the `ASSIGN` statement, like the `SC` function that returns the select code?

A: Yes, you would use the `STATUS` register 3 as shown in the following example:

```
10 ASSIGN @Path TO 720
20 STATUS @Path,3;A
30 DISP A
40 END
```

This code would display 720.

Q: What are the device files for the audio hardware ?

A: When doing a long listing of the `/dev` directory

```
# ll /dev | grep audio
crw-rw-rw-  1 root sys   57 0x208000 Jan 30 18:32 audio
crw-rw-rw-  1 root sys   57 0x208002 Jan 30 18:32 audioBA
crw-rw-rw-  1 root sys   57 0x208003 Jan 30 18:32 audioBL
crw-rw-rw-  1 root sys   57 0x208001 Jan 30 18:32 audioBU
crw-rw-rw-  1 root sys   57 0x208100 Jan 30 18:32 audioCtl
crw-rw-rw-  1 root sys   57 0x208012 Jan 30 18:32 audioEA
crw-rw-rw-  1 root sys   57 0x208013 Jan 30 18:32 audioEL
crw-rw-rw-  1 root sys   57 0x208011 Jan 30 18:32 audioEU
crw-rw-rw-  1 root sys   57 0x208022 Jan 30 18:32 audioIA
crw-rw-rw-  1 root sys   57 0x208023 Jan 30 18:32 audioIL
```

Where :

I	stands for the internal speaker
E	stands for the external jack
B	stands for using both the internal speaker and external jack
U	stands for using 8-bit MuLaw data format
A	stands for using 8-bit ALaw data format
L	stands for using 16-bit linear data format
Ctl	stands for control only (read/write not allowed)

Q: After updating my 9000/720 to a 735 + FDDI, I get an error on boot-up that reads as follows:

```
Advance Digital Audio interface at select code 0x20: function number 8
driver not in the kernel: id=7d my_isc=20
```

This can also be seen in the messages returned from `/etc/dmesg`. How do I get the Audio driver into the kernel and correct this problem?

A: The behavior you are seeing is not an Audio problem. The first line of the error message tells you that the Audio is correctly registered with the kernel. There is no user-configurable driver for the HP-UX kernel. Driver for Audio is automatically linked into the kernel by default. The second line of the error you indicated is the result of the FDDI you included in the upgrade not being able to register with the kernel because the FDDI driver is not in your kernel. Adding the FDDI driver to the HP-UX kernel will clear this message.

Q: When trying to start the Aserver on an HP 9000 Model 715 system that has instant ignition installed, I get:

Cannot get localhost address - audio-server exiting

We can ping the machine and the llbd is running. What is the problem and how do I fix it?

A: The problem is that the `localhost` entry in the `/etc/hosts` file is either not there or not being read.

To resolve, check the `/etc/hosts` file for an entry that looks like

```
127.0.0.1 localhost
```

or

```
127.0.0.1 loopback localhost
```

This is the loopback alias. If this entry looks OK, then check for NIS running on the machine.

If NIS is running, the problem could be that the nameserver did not include the localhost. ■

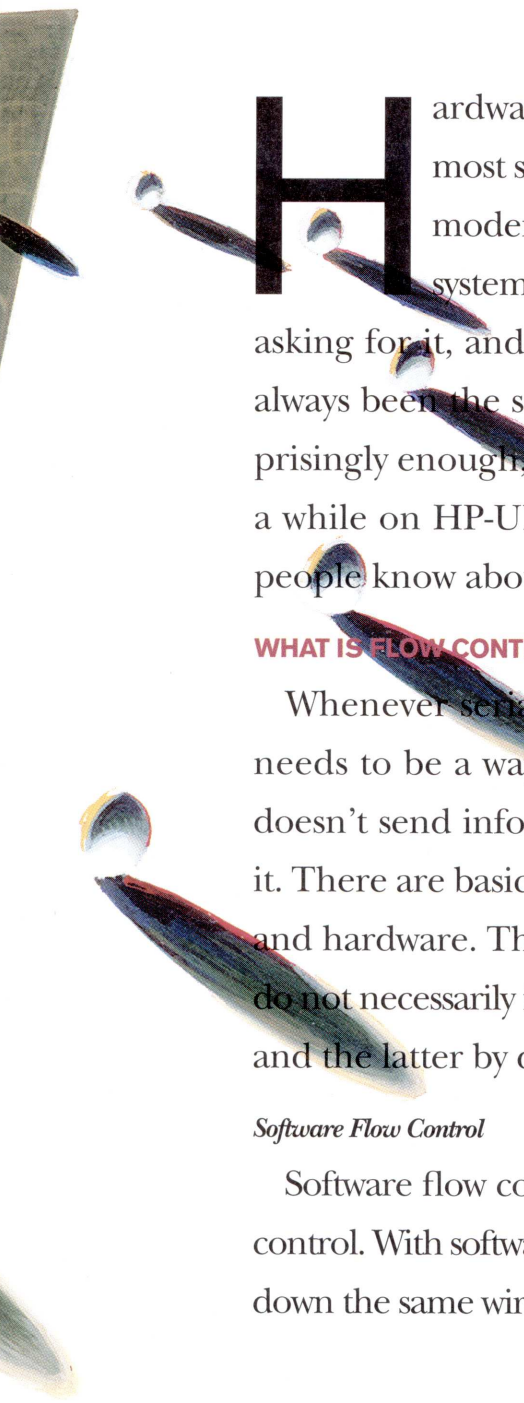
Kaushik Mehta of the Hewlett-Packard Response Center in Atlanta, Georgia, answers workstation questions.

Hardware Flow Control



on HP-UX Serial Ports

You mean HP-UX Really Has it Now?



Hardware flow control on serial ports is one of the most sought after features for those who interface to modems and serial printers and plotters on HP-UX systems. Ever since I can remember, users have been asking for it, and ever since I can remember, the answer has always been the same—No! But times are changing and, surprisingly enough, hardware flow control has been around for a while on HP-UX systems. The only problem is that so few people know about it.

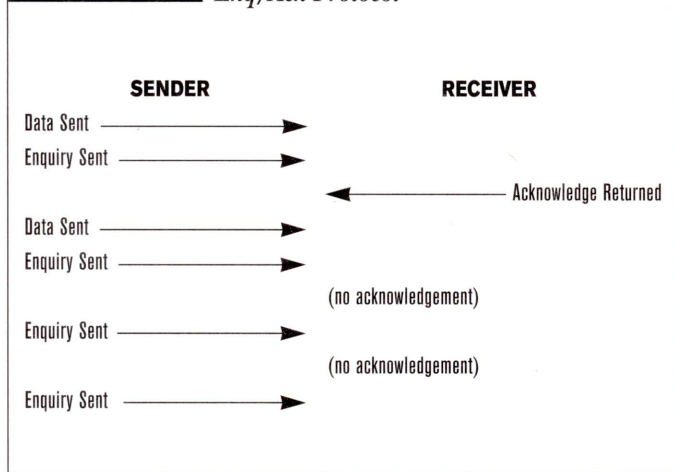
WHAT IS FLOW CONTROL?

Whenever serial data is transferred asynchronously, there needs to be a way to control the flow of data so the sender doesn't send information faster than the receiver can handle it. There are basically two types of flow control in use, software and hardware. These terms, as we will see, are misleading and do not necessarily imply that the former is done by programming and the latter by discrete electronic circuitry.

Software Flow Control

Software flow control can more clearly be called *character* flow control. With software flow control, flow control characters are sent down the same wires that other data is sent. Software flow control

John A. Pezzano

FIGURE 1 *Enq/Ack Protocol*

- is simple
- requires no extra wires
- looks like other data so can be passed through modems

Thus on asynchronous serial lines, only the standard three wires (send, receive, and ground) are required.

There are many different types of software flow control but the two most common to HP users are Enq/Ack and XON/XOFF.

In traditional HP systems, HP used its own flow control called Enq/Ack. The sending device would send a block of data and then send an enquiry character (**ASCII CODE 5 Ec**—Control-E character created by holding down the Control Key while hitting the E) asking the receiver to acknowledge when it was ready for more. The receiver would respond with an acknowledge character (**ASCII CODE 6 Fc**) when it was ready. If the receiver failed to send the acknowledgment, the sender would continue to send enquiries and would not send any more data. Figure 1 shows this type of flow control.

Enq/Ack protocol is a positive acknowledgment protocol. If the receiver fails to send the acknowledgment, no more data is sent. Therefore, if the printer is turned off or the line is broken, the

computer stops sending. In the world of personal communication, Enq/Ack could probably be compared to a business not sending any more goods until the prior goods are paid for. Dunning letters are sent if there is no response to the first shipment. There are a few problems with Enq/Ack, principally due to the fact that only HP uses it extensively, so finding third-party devices that support it is difficult unless the products are made for the HP market.

XON/XOFF is another software flow control. With XON/XOFF, the receiver controls the data as shown in Figure 2. When the receiver sends an XOFF (**ASCII CODE 19 Sc**), the sender stops. When the receiver sends an XON (**ASCII CODE**

17 Qc), the sender continues.

Since the receiver knows when it is ready to accept data, it can decide when to tell the sender to stop and go. The advantage of XON/XOFF is that it is standard and available on virtually any printer and high-speed modem around. The disadvantage as compared to Enq/Ack is that there is no way for the sender to know if the receiver ever got the data. A lack of an XOFF could be due to the inability to handle the data as fast as it comes or the fact that the device at the other end is off or not even connected. In the world of personal communications, XON/XOFF can be compared to those record clubs that continue to send you and bill you for records unless you send them a postcard saying you don't want them. You get them even when on vacation or if you no longer live at that address.

In general, there are other disadvantages to software flow control. Since the control information looks just like data, it is subjected to the same problems of data. It may be lost because of

- parity or framing errors
- weak signal levels
- confusion with data, particularly binary data
- delays due to the need to software process the flow character
- inability of older transfer protocols such as uucp to deal with it

Hardware Flow Control

As an alternative to software flow control, there is a technique involving the use of separate wires along with the serial data to provide independent signals that control the flow of data. This is commonly referred to as hardware flow control. Understand that the processing of software flow control may be equally done in hardware, but most people consider hardware flow control to mean using these separate signal lines. In hardware flow control, the receiver drops the signal on its control line, which tells the sender to stop until such time as the signal is raised.

The advantages of hardware flow control are twofold:

- reliability
- speed

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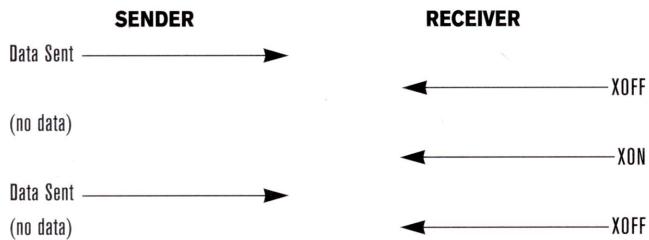
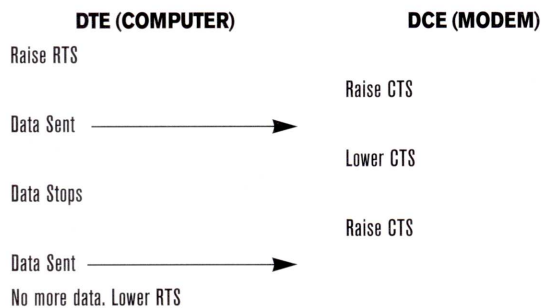
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FIGURE 2 XON/XOFF Protocol**FIGURE 3** RTS/CTS

Reliability is due to the fact that a power loss, cable break, or other problem will cause loss of signal, stopping the data. There is no character to interpret, no confusion with other characters, no parity or framing.

Because of the simple drop in the signal line, the sender sees the signal instantly as compared to a full character width in software flow control. In addition, the circuitry necessary to implement this stopping, if really done in hardware, is quite simple. Thus for high data rates, hardware flow control is a much better method of stopping high-speed transfers. Hardware flow control has two major drawbacks:

- Extra wires are required.
- There are no defined wires available in RS-232 to do bidirectional flow control.

Hardware flow control requires an extra signal line between sender and receiver for each direction. Unfortunately, that means that the simple, three-wire cable now has to be five wires. The connectors may be bigger; there may not be wires available if, for example, four-wire phone cable is used. Worse, standard RS-232 cables have no defined pins for hardware flow control for bidirectional transfer.

Among the RS-232 signals are *Request-to-Send* (RTS) and *Clear-to-Send* (CTS). The intention of these is to provide hardware flow control to modems—otherwise called Data Communication Equipment (DCE) devices—from computers, printers, or terminal devices—otherwise called Data Terminal Equipment (DTE) devices. The computer will raise RTS when it has data to send and the modem will raise CTS when it is ready to accept the data, as shown in Figure 3. These signals have been used, though, for a slightly modified purpose. As shown in Figure 4, with some slight changes, the RTS signal can be used by the computer to tell the modem to send data and the CTS signal can be used as it was intended, for the modem to tell the computer to transmit.

The result is that we can now use these signals to achieve bidirectional flow control. There are, however, some downsides:

- Not all devices support bidirectional use of hardware flow control.
- Not all devices use these signals to achieve flow control.

Although many modems support the use of RTS as shown in Figure 4, it is wise to check that the one you intend to use will do so. Some printers, especially older ones, don't use these signals and, instead, depend on being able to raise and lower *Data Terminal Ready* (DTR) instead of RTS, and thus the DTR signal from the printer has to be wired to the RTS input of the modem.

HP-UX COMPUTERS AND HARDWARE FLOW CONTROL

Hardware flow control on HP-UX systems requires the following:

- an interface that supports hardware flow control
- the right cabling
- the right version of HP-UX
- special configuration

Interfaces

Not all interfaces support hardware flow control. For the Series 700 workstations and 800 Business Servers, Table 1 shows most interfaces and their support for flow control. Note that not all interfaces are listed and none is for the Series 300 and Series 400

workstations, although most of these on the Series 300/Series 400 workstations also support at least partial if not full flow control.

Cabling

Cabling for the Series 700 workstations is standard. The recommended HP 24542M cable will provide necessary signals for modems. For printers, you should verify what pins your printer requires for flow control, but the HP 24542G will probably work in most circumstances. For Series 800 Business Servers, the 40233A cable will work for modems. However, there is no standard cable for printers. Figure 5 shows a cable that will work for most printers.

System Software Revision

Hardware flow control requires Revision 9.0 on most systems. For Series 700 workstations, Revision 8.07 can be used, provided a patch to the system is obtained from HP and installed. For Series 800 Business Servers, Revision 8.0 for 8x2 systems and Revision 8.02 for 8x7 systems also require patches. Note that for the Series 800s, there are two patches for each system, one for the driver and one for the stty program. Prior revisions do not support hardware flow control.

For Series 300 and Series 400 workstations, hardware flow control is supported at

Revision 8.0 to a limited extent and fully at Revision 9.0, limited by the interfaces and the processors.

Prior to Revision 9.0, there was no documentation for the use of hardware flow control. The online manual pages and *HP-UX Reference Manual* termio(7)

FIGURE 4 Modified RTS/CTS For Bidirectional Flow Control

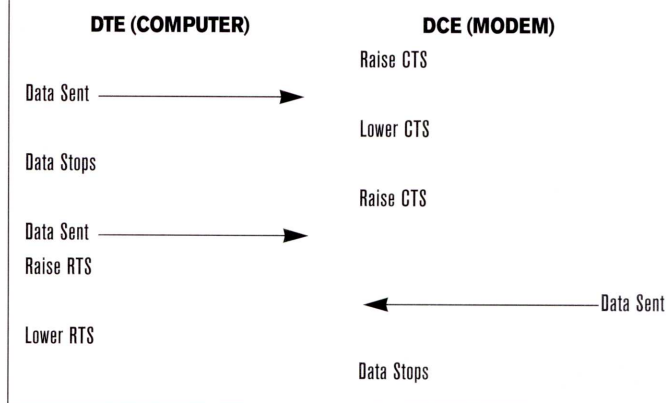


FIGURE 5 HP 9000 Series 800 to Printer

Computer Multiplexer Panel 25 pin male connector pin number	Printer 25 pin male or female connector pin number	Signal Information
1	1	Ground
2	2	Data from printer
3	3	Data to Printer
7	7	Signal Ground
8	5	CTS to printer
22	4	RTS from printer. If printer uses DTR instead of RTS, wire to pin 20 on printer

While pins 8 and 22 are not the standard pins for RTS and CTS, they are in fact the ones used by the Series 800

TABLE 1 *Series 800 and Series 700 Interfaces*

INTERFACE	SYSTEM	COMMENTS
Built-in Interface	All Series 700 Workstations	Supported. Reported to work up to 460KBaud and, along with XON/XOFF, required at speeds above 19,200 baud. Hardware flow control is required to prevent data overrun on the serial processor chip and XON/XOFF is required to prevent driver buffer overflow.
98196A 6 channel and 98190A 16 channel full modem multiplexers	S800 CIO Business Servers	Unsupported. Does not work.
J2092A 16 channel and J2096A 32 channel direct connect multiplexers	S800 8X2, 8X7 and all new Business Servers	Unsupported. Does not work.
J2094A 16 channel full modem multiplexer	S800 8X2, 8X7 and all new Business Servers	Supported. Interface limited to 19,200 baud.
Built-in A1703-60022 Multifunction cards	S800 8X7	Supported for ports connected to panel labeled "full modem." Interface limited to 19,200 baud.

and termiox(7) as well as stty(1) describe hardware flow control.

System Configuration

There are three ways to configure a port to use hardware flow control. They are:

- ioctl(2) calls
- stty(1) parameters
- port minor numbers

Since most users and administrators want to use hardware flow control for printers and modems, I will leave it to the reader to look up ioctl(2) calls, which are designed for the C language programmer.

The stty(1) command now supports two additional parameters, ctsxon and rtsxoff. Turning on ctsxon will cause the computer to respond to an incoming RTS signal from a printer or modem and stop sending when the input line goes low. For printers, this is the only additional parameter needed as printers do not send large amounts of data back to the computer. For modems and other devices that might transmit data too fast, turning on rtsxoff will cause the computer to use this outgoing signal to indicate that incoming data should stop. The use of the terms ctsxon and rtsxoff do not imply that these have anything to do with XON/XOFF software flow control but correspond to the stty software flow control parameters ixon and ixoff, which control outgoing and incoming software flow control respectively. Surprisingly, many users do not read their manuals and think that ixon and ixoff are both required for incoming flow control. In fact, as I mentioned, one is to enable XON/XOFF for outgoing data and the other for incoming data.

Users might note that there is a crts parameter for stty. This does not provide hardware flow control and simply raises the outgoing signal line until it is manually turned off by another stty command. Its purpose is to provide that signal for those devices that require its presence when a port is in use or, like some printers, to make them accept data.

To turn on hardware flow control to a serial spooled printer, the user will have to edit the appropriate model scripts and find all occurrences of the stty command and add the ctsxon parameter to the others already there.

For modems, there is an additional problem. The getty program, which controls logins, and the uucp program, which does serial data communications, do not support the use of the stty command. Therefore, using this command to set port parameters is difficult if not impossible. Fortunately, there is an alternative method, which is to set bits in device file minor numbers to indicate to the driver that all input/output for that port is to use hardware flow control transparently (to the program). For Series 300, 400, and 700 workstations, the device minor number should have an 8 added to it. For example, a port configured as follows:

```
ll /dev/ttyd00 /dev/cul00
<ownership/permissions> 1 0x090000 <date> /dev/ttyd00
<ownership/permissions> 1 0x090001<date> /dev/cul00
```

would be changed to:

```
<ownership/permissions> 1 0x090008 <date> /dev/ttyd00
<ownership/permissions> 1 0x090009 <date> /dev/cul00
```


in the special device file. This can be done by removing the device file with the `rm(1)` command and recreating it with the `mknod(1M)` command as in

```
rm /dev/ttyd00 /dev/cul00
mknod /dev/ttyd00 c 1 0x090008
mknod /dev/cul00 c 1 0x090009
```

For the Series 800, the hardware flow control bit is in a different place. Because the 800 uses logical units for devices and a different naming convention, the following would be used:

```
ll /dev/ttyd0p7 /dev/cul0p7
<ownership/permissions> 58 0x200007 <date> /dev/ttyd0p7
<ownership/permissions> 58 0x100007 <date> /dev/cul0p7
```

would be changed to:

```
<ownership/permissions> 1 0x240007 <date> /dev/ttyd0p7
<ownership/permissions> 1 0x140007 <date> /dev/cul0p7
```

by typing:

```
mknod /dev/ttyd0p7_hw c 58 0x240007
mknod /dev/cul0p7_hw c 58 0x140007
rmsf /dev/ttyd0p7 /dev/cul0p7
mv /dev/ttyd0p7_hw /dev/ttyd0p7
mv /dev/cul0p7_hw /dev/cul0p7
```

I don't wish to imply that printers must use the `stty` command. The use of the device file method will work fine on direct connect ports and for printers as well as for modems.

SUMMARY AND CONCLUSION

Hardware flow control is neither difficult to understand nor difficult to implement. It permits higher serial performance with more reliability. It does mean setting up modems properly, having correct cables, having the right version of the operating system along with any necessary patches, and setting up the serial ports appropriately. While there may be interfaces (particularly those meant for direct connect terminals) that will not support hardware flow control, the future will show more and better support for it, driven by the technology as well as by the needs of the users. ■

John A. Pezzano is an HP Response Center engineer in Atlanta, Georgia. Before moving to Atlanta, he spent seven years as an SE in the HP office in El Paso, Texas, supporting HP-UX systems.

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Managing the HP-UX Environment with CA-Unicenter

My first encounter with CA-Unicenter occurred this summer at the Dedham, Massachusetts office of Computer Associates, the Islandia, New York-based software firm. I spent most of the day at an HP 9000 Series 800 machine running through the various capabilities with CA staff. From the start, I could see that CA-Unicenter was one of the most user-friendly and feature-rich UNIX offerings I had ever seen. I knew that trying to convey this impression to *hp-ux/usr* readers was going to be a bear of an undertaking. Even the pricing is innovative, offering a choice between user- and power-based licensing plans.

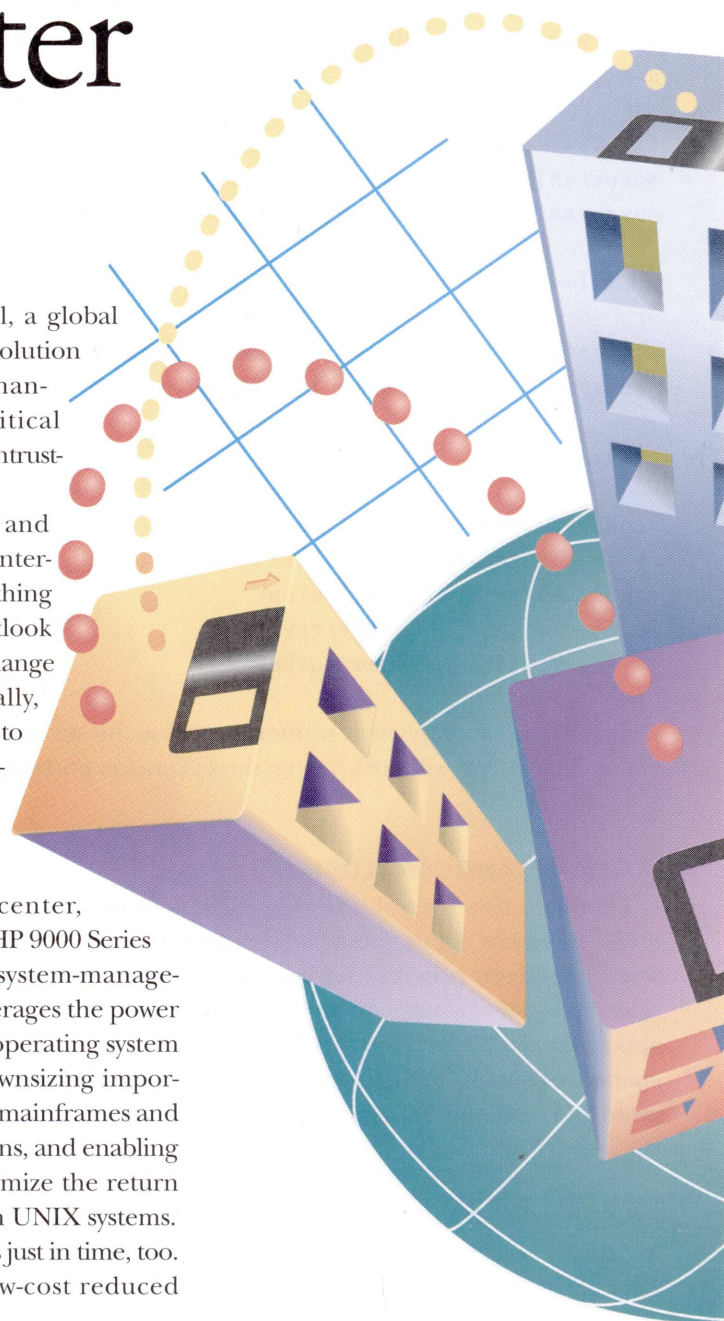
The advantages of the 32-bit multitasking UNIX operating system are well known to most power users in academic and engineering environments. However, because UNIX systems lack comprehensive management tools, users must often struggle with problems of limited productivity, throughput, and resources. In fact, this lack of manageability has stalled mainstream acceptance of UNIX systems in the business

environment. After all, a global systems management solution is a prerequisite for handling the mission-critical applications currently entrusted to the mainframe.

If Hewlett-Packard and Computer Associates International, Inc. have anything to say about it, the outlook for UNIX is about to change in a big way. Specifically, CA-Unicenter promises to accelerate the acceptance of UNIX for mainstream business applications.

CA's new CA-Unicenter, now bundled with the HP 9000 Series 800, is an integrated system-management solution that leverages the power of UNIX, making the operating system more attractive for downsizing important applications from mainframes and creating new applications, and enabling the enterprise to maximize the return on investment made in UNIX systems.

CA-Unicenter comes just in time, too. The prevalence of low-cost reduced



by Nathan J. Muller

instruction set computing (RISC) workstations and the more than 20,000 DOS and Windows applications adapted to the operating system make UNIX very appealing to IS executives. In addition to handling a broad range of information processing needs, UNIX systems make it easier to perform distributed processing, operate client-server networks, and implement distributed databases. With the arrival of CA-Unicenter, the case for UNIX is now too compelling to ignore.

The product uses a Motif-based graphical user interface (Figure 1) and comes with integrated functions for security management, storage management, spooling and report management, problem management, workload management, console management, performance management, and resource accounting. Together, these functions establish a structured environment for networked UNIX systems that closely parallels the centralized data center.

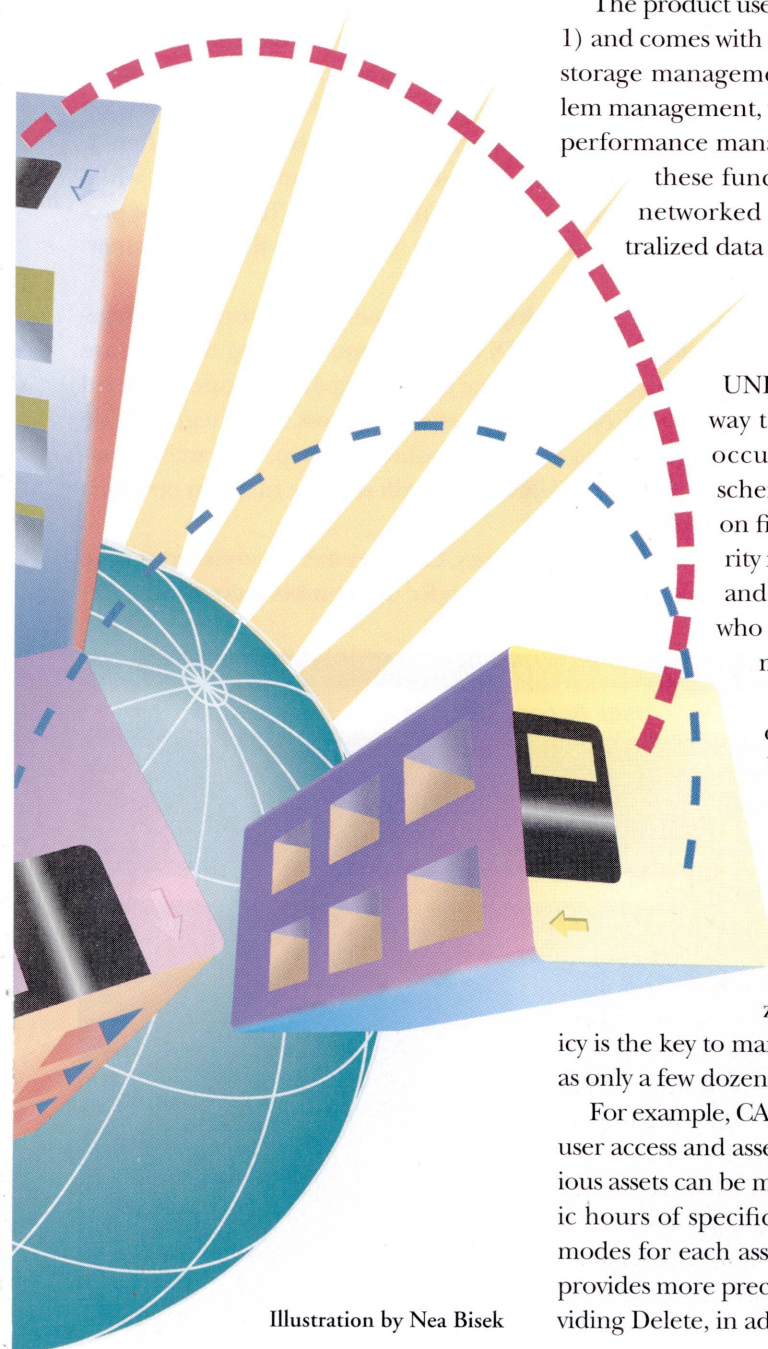
Security Management

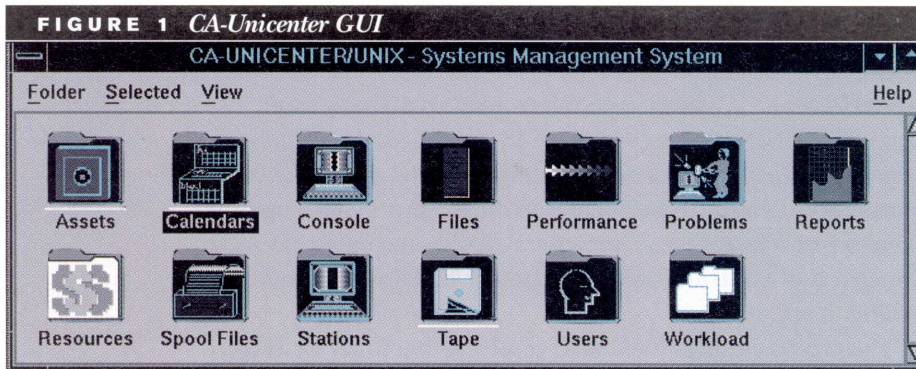
Security has always been a concern in the UNIX environment. Until now, there really was no way to tell when an unauthorized access attempt occurred. Password protection and permission schemes were vulnerable. There were no controls on file use by time of day or day of week. Any security features that were implemented, at great effort and expense, still could be bypassed by a superuser, who could then access any resource and change any management controls.

CA-Unicenter offers a level of security that is comparable to that of most mainframe systems. Under CA's policy-based approach to security, files are protected not by the physical attributes of the file as in HP-UX but by their description in a relational database. This means that newly created files are automatically protected, not at the discretion of each creator, but consistent with the defined security needs of the organization. This set-and-forget nature of security policy is the key to managing thousands of users on a system as easily as only a few dozen.

For example, CA-Unicenter provides global enforcement of both user access and asset access controls. Via a graphical calendar, various assets can be made available to select users only during specific hours of specific days. Whereas HP-UX has only three access modes for each asset—Read, Write, and Execute—CA-Unicenter provides more precise control of each asset or group of assets, providing Delete, in addition to Read, Write, and Execute (Figure 2).

Illustration by Nea Bisek





For each asset or group of assets a different permission type may be applied: Permit, Deny, and Log. Permit allows a user or user group to have access to a specified asset. Deny allows an exception to be made to a Permit, not allowing writes to certain files, for example. Log allows an asset to be accessed, but stipulates that such access will be logged. Default permissions (Permit and Deny) allow security to be phased in. You can protect only a subset of the assets on the system and leave HP-UX security in control of the rest, or enforce a policy of protection by default, whereby no asset may be accessed unless it is defined to the security function and access is specifically given to authorized users.

Aside from a full suite of password controls and tracking features, CA-Unicenter provides the ability to determine whether or not a single login ID can have multiple terminal sessions on the same system. It also allows you to specify an enforcement action to be taken when a user's login ID exceeds the system limit for violations:

- **Cancel:** the access attempt is denied and the process that attempted the unauthorized access is canceled.
- **Logout:** the access attempt is denied and the process group and all child processes associated with it are canceled. If a logged-in user is associated with the attempt, he or she will be logged out.
- **Suspend:** the access attempt is denied and the process group and all associated child processes are canceled. In addition, the login ID is suspended, and the user is locked out of the system until suspension is lifted by the security administrator.

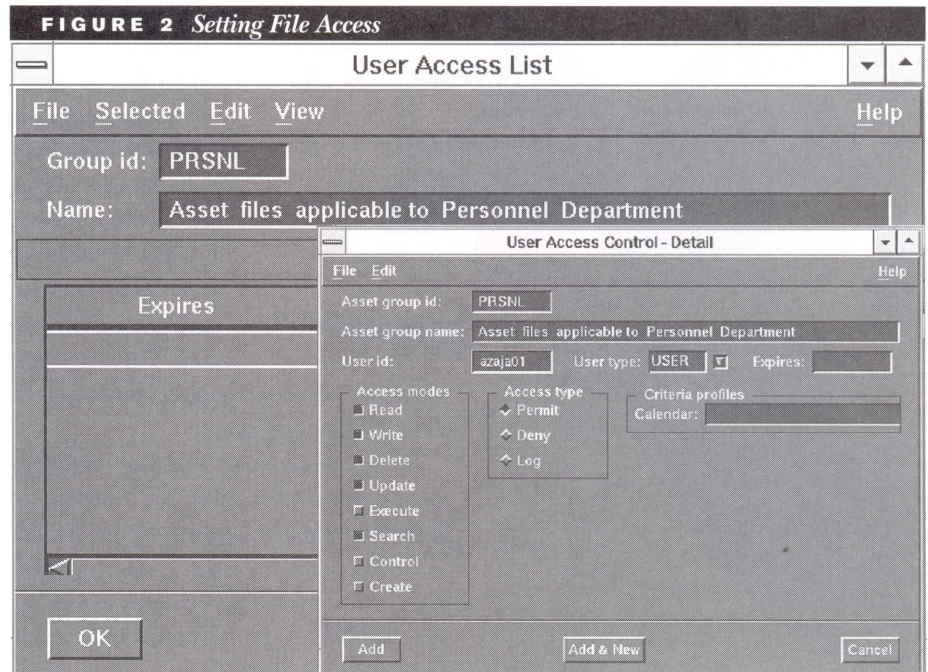
Through the Console Management function, CA-Unicenter provides the means to review real-time and historical violation activity online, along with other system activity.

Storage Management

The native UNIX environment is not very friendly when it comes to managing data on disks and tapes. When disk space is exhausted or a job needs an archived file, work stops. Local backups are often so time-consuming that operators often don't do them, while remote backups tend to clog the network. Tapes are not protected against overwrites, which can result in the loss of important data.

CA-Unicenter brings mainframe-quality storage management tools to the UNIX environment, ensuring that files are backed up at the right time and that tapes are properly labeled and write protected to prevent data loss. An integrated file manager system tracks the online, backup, and archive versions of every HP-UX file, regardless of the medium on which the file resides.

By tracking file residency, CA-Unicenter's automated storage management (ASM) provides for the seamless movement of files



from backup to archive and back to the system when needed. Through the common file catalogue of ASM, the archive facility can locate and initiate a restore of an archived file without user intervention. Any user request, process, or program attempting to access an archived file is suspended until the file is restored, and then allowed to continue without failure.

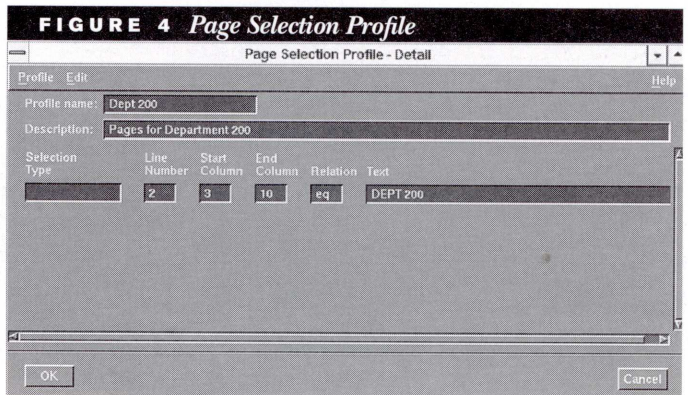
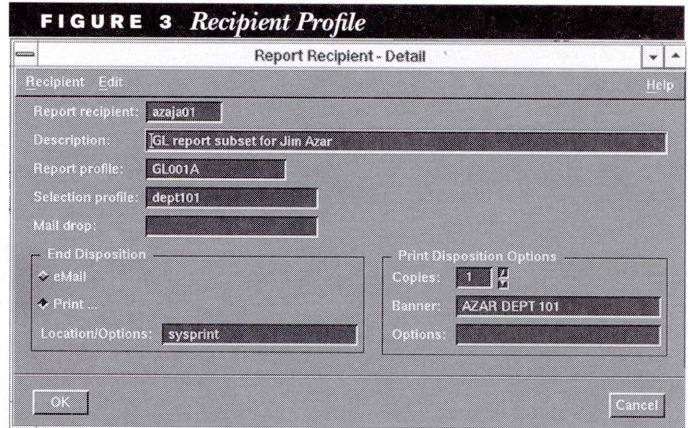
ASM also ensures that users have enough disk space to accommodate new files. When a file system reaches a predefined threshold of X percent full, ASM is initiated, using the common file catalogue to determine which files eligible for archive are currently backed up. CA-Unicenter then simply updates the catalogue to indicate that the files have been archived and deletes them from the disk file system, freeing up needed disk space. Of course, the automatic restore feature stands ready to put back any files that are needed later on.

Files backed up or archived to tape can be assigned an expiration date. Each tape has an internal label that is validated each time it is mounted. File location information, stored in the ASM common file catalogue, is compared with the tape label to determine whether the tape may be overwritten. If so, it is considered expired and may be removed from the tape backup or archive pool for reuse. Tapes removed in error cannot be overwritten and new retention criteria are established for expired tapes when they are reused.

In the movement of files for backup and archival storage, CA-Unicenter overcomes many of the limitations of the UNIX tar program. It offers file compression of 30 to 70 percent and an encryption scheme to prevent loss of data resulting from tampering. And whereas tar is limited to writing data in 5k blocks, CA-Unicenter's ASM function uses dynamic block adjustment to optimize performance based on media type and available memory. The CA-Unicenter backup program also is much faster than other options, with an average rate of approximately 2 Gbps per hour.

Spool and Report Management

The UNIX spooler (lp) is cryptic, with hard-to-remember commands for manipulating the spool. CA-Unicenter eliminates the need to remember commands and command keywords, substituting a graphical interface for manipulating and viewing all spooled work. For instance, users can prioritize print jobs and define or enable printers. Specific pages of a document can be selected for printing, as well as the number of copies. CA-Unicenter also provides the status of the print job, and allows you to view the printed file online. Jobs in queue can be canceled at any time.



This level of control aids the distribution of reports, especially large ones that are produced on a regular basis. For each report, a recipient profile can be created (Figure 3) that describes how it will be handled. A report can go to the accounting department's printer, for example, or be delivered to a specific user via electronic mail. E-mail is useful when the report requires further manipulation or integration into another file. Since various recipients may need only a few pages of a large report, the specific pages or portions of pages can be selected for print or electronic delivery via page selection profiles (Figure 4).

CA-Unicenter tracks report delivery and maintains an audit trail of all reports.

Workload Management

The UNIX scheduler (cron) is based on date and time-of-day, and does not recognize predecessor/successor relationships. Furthermore, submitted work is not tracked, so it is hard to know what is happening at any given time. CA-Unicenter overcomes these limitations, offering tools for workload planning, workload processing, and calendar- and event-based scheduling.

The workload planning component of CA-Unicenter provides a central location for the information needed to manage and process production work. It contains the job and jobset

FIGURE 5 *Manual Problem Entry*

Problem - Detail

Problem id: 3 Affected component: l33b99x

Description: Not loading the proper fonts

Resolution:

Status: ACT Logical name: Control no: 0

Priority: 3 Serial number: 83729104US Location: NYC3rd

Category: PRT Escalation table: NORM User:

Resp area: ADM Action by Date:

Contact: Paul Kelley

Phone: 212-555-2849

Notification Summary			
	User	Date	Time
Occurred:	plk02	03/06/1992	12:00:00.00
Vendor informed:			00:00:00.00
Engineer arrived:			00:00:00.00
Problem resolved:			00:00:00.00

OK Cancel OpLog

do a database update after closing a particular spreadsheet.

Problem Management

CA-Unicenter's problem manager provides basic help desk functions through a problem tracking and reporting system. Problems can be entered manually (Figure 5), or automatically when abnormal events occur based on user-defined thresholds or conditions. The facility monitors progress in resolving problems, escalating them to a higher priority or shifting responsibility to another area if necessary. Each problem area is defined by category codes, status codes, responsibility, areas, and priority levels.

The inventory management facility allows you to track problems related to

profiles, workload sequencing information, job dependencies, processing requirements, and priorities for jobs. This component also provides the ability to monitor and balance the load on a given node, and route units of work to the least busy eligible node on the network.

The workload processing component provides automatic submission of recovery jobs or jobsets should a scheduled job fail. Integration with console management provides facilities that enable administrators to define specific actions that are to be performed in the event of an interruption, which also can speed job recovery and restart.

With calendar-based scheduling, jobsets are identified and dates selected for when they are to run. For example, the system administrator may want to schedule the weekly archiving of all files not accessed in the past 60 days with the objective of freeing at least 100 MB of disk space. The first job in this jobset triggers the manual process of gathering scratch tapes for the archive. The second job archives all files not accessed in 60 days. The final job triggers the manual task of reviewing the results to make sure at least 100 MB of storage has been freed.

Event-based scheduling runs predefined workloads when dynamic events occur in the system, such as the close of a specific file or the start or termination of a job. You can generate your own events that trigger predefined actions. For example, you can archive all files in a directory after the last print job or

computer hardware and software. With machine-generated problem tracking (MGPT), you can extend the basic help desk functions to track other problem categories, such as applications and security. To have the system identify problems automatically, you develop a policy associated with each type of problem. In this way, CA-Unicenter can detect literally hundreds of possible problems: unusual security conditions, failed batch processing, excessive CPU usage, or unusual file activity, to name a few. When problems are resolved, the records are retained in the problem management database for reporting and future reference.

Console Management

CA-Unicenter provides a graphical interface through which the system administrator can view all system console traffic. It includes syslog messages for all running programs or user processes, as well as CA-Unicenter status information. Each message entry includes the login ID or program name of the message originator, the date and time the message was issued, and the host name where the message was issued (Figure 6). This facility enables a single person to administer an entire network of heterogeneous computers.

Depending on the size and complexity of the UNIX system, the console may process hundreds or even thousands of messages per minute. Through the console management

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facility, you can define policies that highlight important messages, automatically respond to messages, and identify unusual conditions requiring additional information.

Resource Accounting

CA-Unicenter offers a flexible facility for charging users for UNIX resources. You can define user-friendly aliases to replace the often cryptic accounting data structures found in UNIX. This makes chargeback administration more intuitive, helping to reduce implementation time and associated costs.

With the overhead allocation feature, you can identify systems overhead costs, have these costs expressed in different terms, and automatically have these costs distributed proportionately to users of the system. The rates for various resource usage can be dynamically adjusted, with the results of each adjustment viewable immediately. You can even split the costs associated with a particular resource's consumption by a single consumer across a larger user community. Up to five levels of chargeback can be defined, such as division, department, team, group, and member (Figure 7).

The resulting reports not only lend precision to resource accounting but the information can be made available in multiple formats as required by auditors, system programmers, operations managers, applications development personnel, and IS management. The accumulated information also can be used for detailed trend analysis of resource use. Statistics on system, file, memory, terminal connect, program use, and other activities can be summarized to determine growth rates and to project (or justify) system

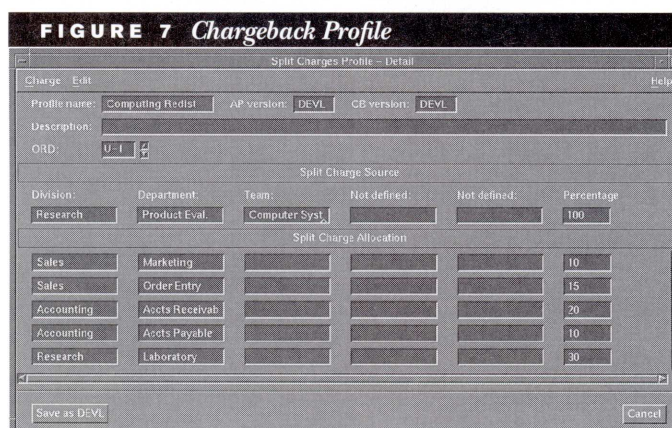
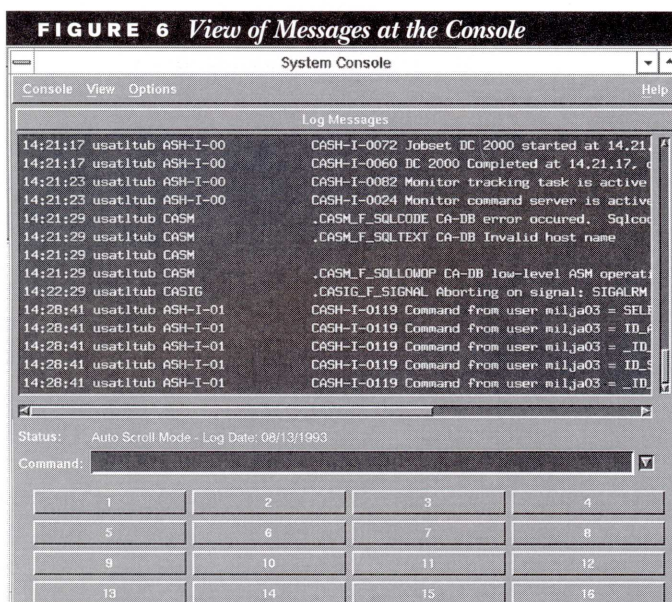
upgrades and additions in a timely manner, before resource shortages become critical.

To make this and other kinds of information more useful, Computer Associates has bundled its Motif-based CA-20/20 spreadsheet software with CA-Unicenter. CA-20/20 provides direct access into CA-Unicenter's resource accounting database, allowing you to apply the spreadsheet's forecasting, graphing, and analysis tools to raw data stored in industry-standard SQL format, even if you don't know SQL.

Performance Management

UNIX accumulates a variety of information on resource usage and system activity, but this information is stored in a number of separate files and must be merged and customized through shell scripts to get a true picture of system performance. Although this is adequate for basic resource accounting needs and may well satisfy the needs of UNIX environments where there are infrequent changes in system resources or the user community, most UNIX environments today are growing and evolving rapidly.

CA-Unicenter improves performance monitoring by providing a window into the real-time performance of the system, displaying such critical information as memory usage, paging rates, and I/O load. By itself, this capability is not a big deal. In fact, performance monitoring is the weakest aspect of CA-Unicenter. But the CA-Unicenter GUI can be used to launch other applications, such as PerfView and PerfRX, which run under HP's OpenView OperationsCenter, a centralized systems management application that seamlessly



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integrates the network and systems management functions across the network.

PerfView provides UNIX users the means to monitor heterogeneous networked environments. It consolidates performance information from software data-collection agents sitting on network nodes. The agents look for conditions that fail to meet IS-specified performance thresholds. PerfRX, which runs in conjunction with PerfView, is a performance analysis tool that tracks performance data including CPU, disk, and memory transaction rates and response time for better network planning and improved resource utilization.

CA-Unicenter does not support the Simple Network Management Protocol (SNMP), which would have been a nice feature for managing remote UNIX systems. In the future, according to CA, Unicenter will be provided with an SNMP sieve, enabling it to receive and process any network-related events. In addition, a custom CA-Unicenter trap will be provided to broadcast specific CA-Unicenter events such as workload- and security-related alerts to other CA-Unicenter or network-information-sensitive products such as HP's OpenView and IBM's NetView.

Specifically, the NetView interface being developed for CA-Unicenter will incorporate an SNMP2 communication capability. The interface will contain an event receiving component that will enable the CA-Unicenter console manager to evaluate

and take action based upon SNMP alerts. This message/action capability will include translation of messages, issuing of system and CA-Unicenter commands, propagation of messages, and automatic opening of trouble tickets in the CA-Unicenter problem management system. In addition to receiving SNMP messages, a custom trap will be provided to enable the console manager to transmit CA-Unicenter alerts so that exception conditions related to the management of each system can be easily tracked and monitored via network-aware products (i.e., OpenView and NetView). For example, this interface would enable the network administrator to receive notification of special security conditions, such as a violation against a critical file or login ID, or a scheduled job not starting on time.

Pricing: A New Paradigm

When it comes to pricing CA-Unicenter, Computer Associates offers an alternative to the traditional tiered pricing commonly employed in the mainframe environment. Instead, CA provides both user- and power-based pricing, under which UNIX customers license CA-Unicenter according to the number of users, or the total processing capacity of all workstations on the network. Pricing by the total power rating can offer substantial savings over user-based pricing. In addition, Enterprise Pricing has been instituted for clients using a large number of mainframe CA products as well. Enterprise Pricing allows the

client to pay a flat rate for all CA software based on total processing power, or MIPS, in the environment.

Conclusion

Of course, this is only a thumbnail sketch of CA-Unicenter. The product reveals amazing breadth and depth. The one deficiency of CA-Unicenter is its lack of automatic discovery for the inventory management facility. Equipment and locations must be entered manually into the system. However, profiles of users, printers, and files in the file system are loaded automatically as part of the install process. This can aid the timely implementation of CA-Unicenter. Also, CA assures me that automatic discovery for inventory management is high on its list of future enhancements.

At any rate, you will have a chance to road test the product yourself with your next purchase of a Series 800 machine. Hewlett-Packard is so impressed with CA-Unicenter that it is currently the only application it bundles with new HP 9000 Series 800 systems. You can receive install assistance from Computer Associates or Hewlett-Packard. If you register for a free 120-day trial, you will receive the complete documentation direct from Computer Associates.

CA has already ported CA-Unicenter to Sequent and OS/2 LAN Server systems. At this writing, these versions of CA-Unicenter were in CA's beta release program. By the end of the year, CA-Unicenter will be in beta test for Data General's AViiON, IBM RS/6000, NCR SVR4 Series 3000, Novell's NetWare Server Environment, Pyramid, and machines running Sun Microsystems' Solaris operating system. Ports are well under way for SCO UNIX, Olivetti, Windows NT, and Siemens.

By 1994, CA-Unicenter will be well on the way toward fulfilling its promise of providing a highly manageable platform for distributed UNIX systems that will not only pose a challenge to the centralized data center environment, but accelerate the shift to UNIX for mainstream business applications. ■

Nathan Muller is an independent consultant in Huntsville, Alabama specializing in advanced technology marketing and education. With 22 years of industry experience, he has written extensively on many aspects of computers and communications, having published seven books and over 500 articles. He has held numerous technical and marketing positions with such companies as Control Data Corporation, Planning Research Corporation, Cable & Wireless Communications, ITT Telecom, and General DataComm Inc.

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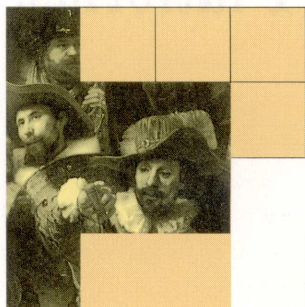
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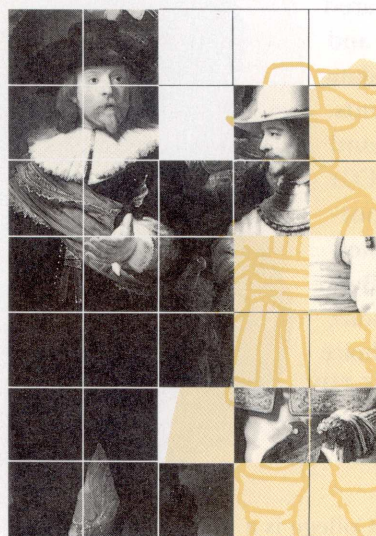
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Implementing HP 9000-890 "Emerald" Platforms: A Case Study

Recently, there has been considerable discussion about downsizing, client-server architectures, open systems, and distributed computing. Hardware and software companies have geared their products, services, and marketing toward such data processing environments. To keep pace, Portland Community College (PCC) recently completed a thorough analysis of possible alternatives to its Honeywell-Bull DPS-8 mainframe operations. This article discusses the choice and implementation of HP 9000-890 "Emerald" platforms.

Strategic Directions

Portland Community College is a large institution with 90,000 students and five major campuses. In late 1991 the college decided that it could no longer be successful with its centralized mainframe environment. PCC's Honeywell-Bull DPS-8 was not able to handle the college's growth and was too expensive to maintain.

A public agency, the college pursued a Request for Information (RFI) process and a Request for Proposal (RFP) process. Vendors were given substantial opportunities to present their products and services. The college received proposals from NCR, IBM, DEC, HP, Sequent, and Honeywell-Bull.

We evaluated each proposal thoroughly; it was important for us to understand all of the technical issues—bus throughput, disk performance in an Oracle RDBMS environment, the relationship between the operating system and multiple processor systems, LAN architecture, consulting and wraparound

services, etc. In addition, we considered how each proposal compared with the college's strategic directions—open systems, distributed computing, client-server architectures, user ownership in a decentralized environment, etc. Also, it was very important for us to choose a vendor who could be trusted.

One of the college's most important strategies was development of "The Sandbox Principle." This principle gave us two advantages. First, we invited vendors to propose solutions without informing them of some of the basic problems. When vendors are asked to propose a variety of products and services that would be "ideal" for a progressive customer, they are given a heavy burden—they become responsible for defining systems. PCC was able to react to the initiatives of the vendors, which put us in a position of strength.

Second, the Sandbox Principle allowed PCC to establish firm boundaries—items on which there could be no compromise (e.g., maximum budget, technology direction). Vendors were then able to suggest how the remaining variables could be adjusted in order to achieve success. The goal of the Sandbox Principle is to create flexibility and maneuverability. It is unlikely that an effective implementation will occur if there is too much reliance on specifications and requirements (e.g., liquidated damages, performance bonds). Instead, there should be firm guidelines, trust, cooperation, and a willingness to solve problems creatively.

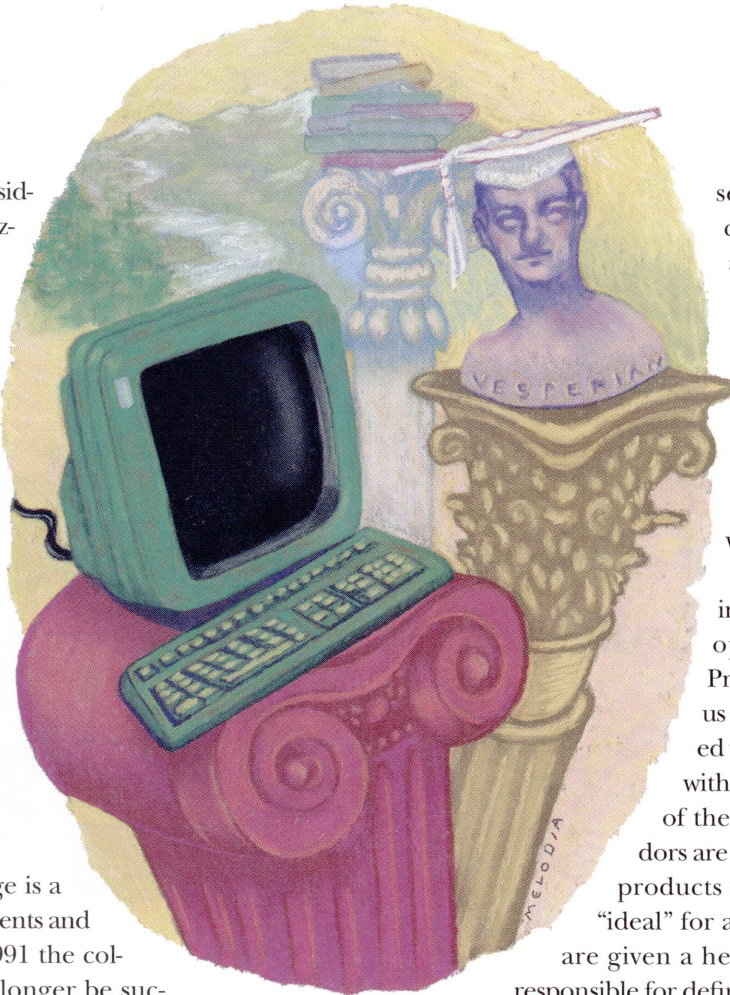


Illustration by Barbara Melodia

by Samuel C. Ellis

Acquisitions

PCC purchased a one-way HP 9000-890, a two-way HP 9000-890, several NOVA servers, 45 GB of SCSI IV disk, DAT tape drives, printers, system software, and a substantial amount of technical support. The small 890 supports office automation applications—electronic mail, calendaring, library applications, and room scheduling. The large 890 is used for administrative computing applications. PCC uses SCT Banner for financial services, student registration, payroll, financial aid, etc. SCT Banner operates on top of an Oracle RDBMS. F, G, and H models within the HP 9000 series are used as servers for special applications—Internet firewall, student electronic mail, and menuing. PCC acquired a site license for Oracle and a limited site license for CAUNICENTER, a systems management package for HP-UX platforms.

The choice of Hewlett-Packard products and services was made through the RFI/RFP process. Their products were technically superior and the company met our strategic directions. HP costs were substantially lower than those of the competition, and they offered good services and technical support.

Implementation

The implementation of Hewlett-Packard hardware began in July 1992, with the installation of loaner HP 9000 systems. PCC made a conscious decision to buy futuristic 890 technology that would not be delivered until early 1993; in the meantime, HP provided systems that would help us begin our software migration.

One of the most important elements in the implementation was the technical support and training that was provided by Hewlett-Packard. The college received excellent service. We were able to resolve technical issues with Oracle and SCT, and carefully transition into a new data communications environment, train the staff in HP-UX, tune the performance of the systems, and design the software environment. The college could not have handled such projects on its own. PCC was able to ensure success and maintain momentum by relying upon Hewlett-Packard for technical support.

The move away from a mainframe environment to UNIX systems is significant. Because PCC's staff had no experience in most of the areas in which they would be working, it was important to provide an effective training program. Before sending anyone to Hewlett-Packard's technical classes, the staff attended a series of informal workshops. One of the college's instructors provided some insights into UNIX, system management, and Oracle so all employees would have a frame of reference during their formal course work.

UNIX manuals, online tutorials, and documentation were available to the staff. A technical library was built to provide a quiet place to study. In addition, we solicited concerns and questions in advance of training.

A few software issues caught the implementation team by surprise. For example, some of the needed products (e.g., SwitchOver) would not be available for our configuration for several months.

Hewlett-Packard was helpful in creating TCP/IP links between the Honeywell-Bull and the new HP 9000 platforms. This arrangement simplified the transition to the new hardware platforms. Everyone was able to access the various systems during our parallel operations. We were not forced into completely abandoning the Honeywell-Bull before feeling comfortable with the HP 9000 hardware.

PCC was delighted with the performance of the HP 9000-890 systems during its software migration. Batch jobs that usually took one hour on the Honeywell-Bull executed in less than two minutes on the one-way HP 9000-890.

Historically, Hewlett-Packard has sometimes been viewed as a confusing company to deal with. Placing an order for products, for example, is frequently a challenge. Hewlett-Packard avoided many such problems during our transformation by assigning a project manager to the college. It was his job to coordinate activities, answer questions, organize services, track deliveries, arrange training, and limit bureaucracy. In addition, the project manager solved problems caused by the college. For example, PCC forgot to acquire a suitable uninterruptable

power supply (UPS). The project manager helped us locate and purchase the proper equipment even though it was not his responsibility.

The college tried to help Hewlett-Packard by developing its own effective organization. There were definite contact persons for various aspects of the project—system software, networking, operations, etc. When implementing new systems, it is important to cooperate with vendors. One helpful strategy involved a standing blanket purchase order that could be used for acquiring new products. When we needed to order more printers, workstations, servers, etc., the information services department could call to promptly order equipment.

Weekly or bi-weekly status meetings with Hewlett-Packard representatives are also a good idea for new customers. Everyone keeps track of assignments and discussion items. The goal is to promote communication and a positive sense of direction.

The information services department found it helpful to set mileposts for its projects, with celebrations when specific goals were accomplished. Otherwise, the project would have become a long ordeal with few rewards.

We also found it important to talk with Hewlett-Packard about their hardware upgrade paths. Every computer company is developing new technology in order to remain competitive; Hewlett-Packard is no different. It seems that improved disk drives, microprocessors, printers, LAN products, etc., are being announced on a daily basis. Making a nondisclosure visit to the HP factory in Cupertino, California is helpful in understanding options.

One of the attractive features of the Emerald architecture is that it is well

suited to a client-server environment. The throughput of the system bus and the performance of the SCSI IV disk drives and adapters make it an effective "data warehouse" for large installations. Because the Emerald contains all of the data common to a number of applications, customers should consider moving their applications to servers and use an Emerald as a repository for the data that must be shared. For example, a payroll system might be installed on an HP 9000-H, a general ledger might be installed on an HP 9000-I, and an HP 9000-890 would contain data that is common to both. Data specific to a particular module remains on the application server. The success of such an arrangement requires a sophisticated database management system, data-integrity strategies, and a high-performance data communications system.

PCC found it necessary to acquire quite a bit of additional system software. Those familiar with MPE environments will be disappointed by the lack of functionality in a UNIX environment. We found Hewlett-Packard's performance tools (e.g., Glance, RX Forecast, LaserRX) to be helpful, as well as PerfView, OpenSpool, SwitchOver, and OpenView.

Evolving Strategies

It was necessary for us to review strategic directions when implementing the new technology. At PCC, we completely reorganized our information services staff to fit our advanced computer environment. That is, our shift away from a centralized mainframe meant that job duties would change. We knew that it was imperative for employees to understand how they fit within the new systems being built.

Another strategic direction that evolved at PCC was the development of an information utility. The Portland Community College Advanced Computing Environment (PACE) emerged as a critical goal. It was not our goal to have a variety of mutually exclusive information resources. Instead, we wanted standard points of connectivity in every office, lab, library, and classroom, allowing users to access administrative computing systems, Internet, electronic mail, FAX services, telephone services, remote databases, multimedia applications, etc.

PACE represents an information utility that provides integrated voice, data, and video services. It is PCC's sense that such infrastructures will become increasingly important. Moreover, most organizations will spend the bulk of their technology budget on such projects.

Additional Information:

Additional information on PCC's migration to open systems technology can be found in publication #5091-7345E from Hewlett-Packard. ■

Samuel C. Ellis, Ph.D. has been the Associate Vice President for Information Services, Portland Community College, since 1991. He supervised the complete overhaul of administrative computing, instructional computing, and telephone services, and directed the development of the Portland Community College Advanced Computing Environment (PACE).



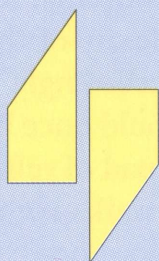
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CIRCLE 04 ON READER CARD

Remote Network Monitoring and Fault Isolation Using OpenView



OVER THE PAST SEVERAL years the computer industry has seen a dramatic migration of computer systems, from the “glass house” to the desktop. The power that once resided in the largest of mainframes can now be obtained in a machine the size of a pizza box. With this new, relatively low cost source of compute power has come an increasing dependence on local (LAN) and wide (WAN) area networks. The applications and data that once resided on

the company mainframe, in a central location, are now distributed throughout several remote sites and are accessed remotely via the network. As companies distribute the applications and data across the geographical topology of the company, the size and complexity of the network grows accordingly. The network that could once be monitored with a pad of yellow post notes and a walk around the computer room now requires a team of

JEFF HODGES



Illustration by Courtney Granner

remotely, and require special expertise to operate, it would not be cost-effective to have a network engineer at each device location.

2. Since the network is no longer contained at a central site, the network engineers are distributed at key sites throughout it. Problem resolution tools and procedures must be implemented to ensure that the responsible parties work in unison to restore service when an outage occurs. Known problems and resolutions must be electronically accessible to ensure that a network engineer is not spending time working on a problem with a known solution.

3. Due to the sheer number of the devices located on the network, historical data must be collected and trend

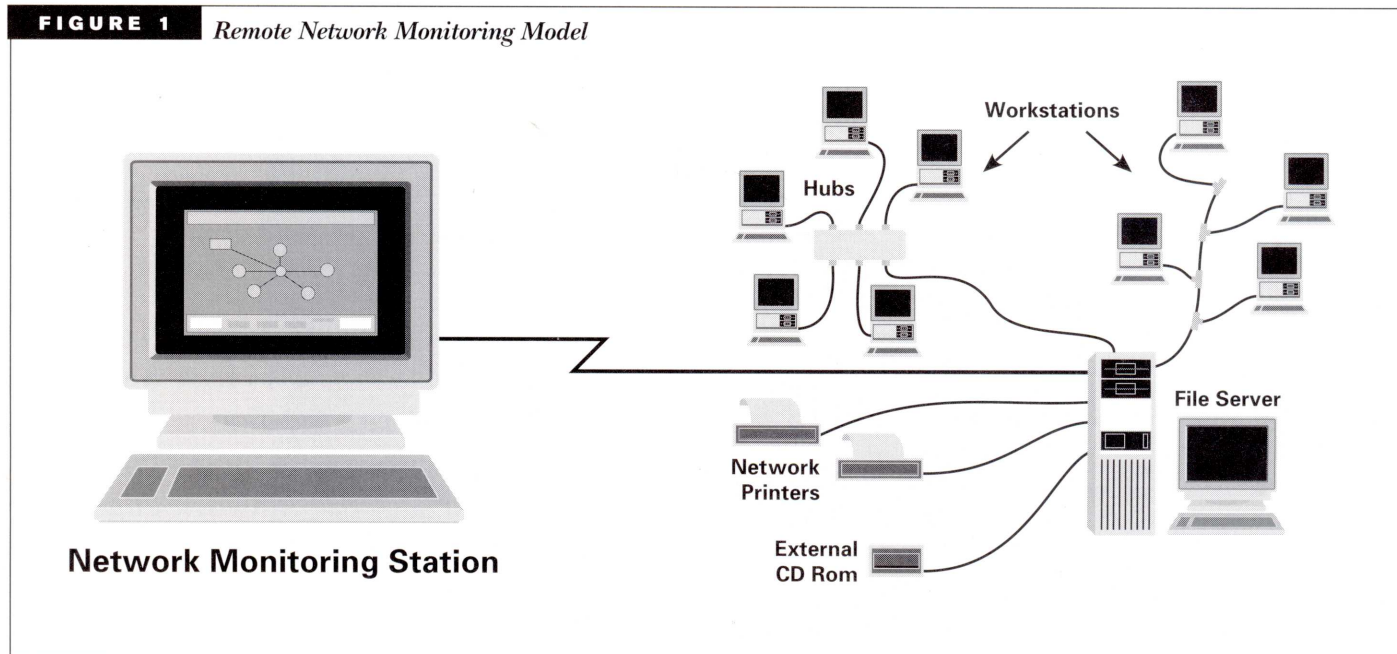
network and system engineers located throughout the company and a suite of sophisticated network management applications.

This distribution, and the dramatic increase in size and complexity, pose several new problems to the network engineers responsible for maintaining the company network.

1. With the increase in network size, sophisticated network

devices such as routers, bridges, gateways, hubs, and probes become essential. In addition to the normal system monitoring, these devices require constant monitoring and maintenance, to ensure that the network does not become overloaded. Since these devices are often located

analysis performed to ensure that the network traffic is appropriately distributed across the network devices. Heavily loaded devices and links must be identified and corrected before failure occurs.

FIGURE 1 *Remote Network Monitoring Model*

These issues have prompted a large number of software companies to develop software tools to monitor and identify problems with network devices. HP OpenView Network Node Manager, SunNet Manager, and IBM NetView are all examples. These tools typically provide mechanisms to collect statistics and generate reports on individual network devices.

Software companies have also targeted the need for problem resolution (trouble ticketing) systems, with products such as Remedy Action Request System, Network Paradigm, Quintus SMS, and Peregrine PNMS. These tools all provide mechanisms to allow users to open, assign, document, and close trouble tickets. They provide a way for multiple engineers to work on and solve a given problem, each using his or her special expertise.


Even with these sophisticated tools, network engineers must often concentrate on fire-fighting exercises and cannot accurately document and resolve network events. Consider the following example:

A network engineer notices a workstation down when the monitoring tool he is using turns an icon representing the device red. The engineer starts to open a trouble ticket, when another workstation icon turns red. The engineer notices the outage but must continue opening the ticket. Before he can finish, a critical router turns red and his attention is automatically taken from the two workstations and applied to the router. He successfully restarts the router and documents the solution. By this time the two workstations have come back up and no action is required.

All seems to be okay: both of the workstations are up, and network traffic is restored through the router. The problem occurs when trying to determine the availability of the workstations. Neither of the workstations would have any explanation as to why it was down during the router outage. This can really be a problem if the workstations have actual defects, and are constantly overlooked due to fire-fighting. In this case, the workstations

could fail completely, and there would be no preliminary notification. Worse yet, if a network service provider were responsible for monitoring the network, they would have no explanation as to why the workstations were down and would have a hard time justifying their cost.

In the pages that follow we will construct an environment, using HP OpenView as the base, that will simplify the network engineer's job. When we are through with our construction, we will automatically generate trouble tickets based on qualified network events. We will be able to reconcile the trouble tickets automatically to explain why a given device was down at any time. We will also be able to exclude any outages that may be related to scheduled maintenance. The data collected by the monitoring system and the trouble ticketing system can also be correlated and used to anticipate problems. We will then take our monitoring to the system level and show how a system management tool easily fits into the environment.

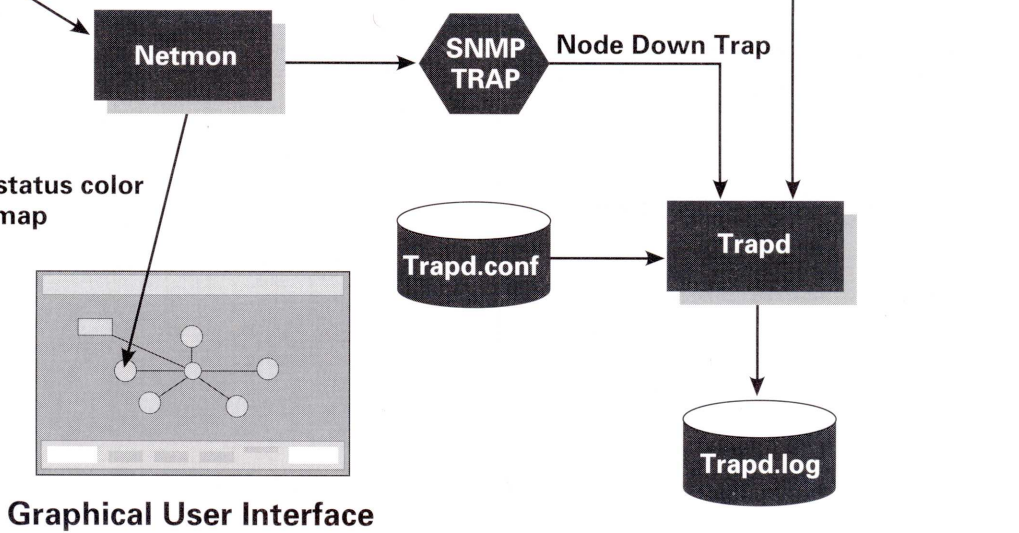


**Now the first name
in PC connectivity is
the last word in X. . .**

FIGURE 2 Fault Detection

Netmon sends an ICMP echo request to a device and the device does not respond

Change status color on icon map



Model

For the purposes of our discussion we will use the system model represented by Figure 1.

We will assume that we are monitoring a large (< 1000 node) TCP/IP-based internet, from a remote site located somewhere in the internet. We will assume the network has a number of bridges, routers, hubs, and probes, in addition to the computers and printers.

HP OpenView Network Node Manager will be used as the monitoring tool on the monitoring station. In practice, any network management tool with a graphical representation of the network and the ability to create an event log file would suffice.

We will assume that network engineers or service providers are dispersed throughout the network, and are coordinated

by the network engineer at the monitoring station. Based on these assumptions, we will now construct our environment.

Monitoring Faults

The first item to consider is the network faults (events) you want to monitor for. The most obvious is the status (up/down) of the device. On TCP/IP-based networks this can be determined by sending an ICMP echo request (ping) to each device monitored. If the device does not reply within a given time period, it is considered down. Network Node Manager performs this function via the "netmon" daemon. If "netmon" determines a device is down, it will change the color of the graphical icon representing the device, then generate an SNMP (Simple Network Management Protocol)

trap with an event ID specifying it as a "Node Down" event.

It is not required that all of the devices on the network support the SNMP protocol. OpenView utilizes it to channel all network events through a single point of access, namely the "trap" daemon. SNMP does make application generation and statistical data collection much easier, given that the protocol is independent of platforms, thus allowing network engineers to access information in the same method on an HP machine as on a Sun system. We do not need to discuss the SNMP protocol in any greater detail for our discussion. Recognizing that each network event can have a unique identifier associated with it, and the fact that it provides a platform-independent mechanism to collect and store information, will be enough.



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Figure 2 illustrates how the Network Node Manager handles network events.

We may also wish to monitor network devices for heavy utilization. We could establish thresholds for a performance characteristic and then periodically check the characteristic on the network devices from the management station or from a process running on the device. If the statistic exceeded the threshold, we would generate an SNMP trap with an event ID for threshold exceeded.

It's clear that we could extend this principle to monitor non-network information such as critical applications, disk space, and processes. We now have a tool that will notify the network engineer of the events we wish to monitor. In the next sections we will examine the process that occurs when a network engineer is notified of a network event.

Problem Resolution

Given the size of our network (> 1000 nodes), we can expect to have a team of network engineers whose sole function is to keep the network and its devices working. To ensure that the network events detected are resolved without any unnecessary engineering effort, we will use a problem resolution (trouble ticketing) tool. This tool will provide the engineers a way to document the problem resolution process.

Each time a qualified network event is detected, an engineer will open a trouble ticket. The trouble ticket will document the effort performed by the engineering team to solve the problem. The trouble ticket will remain open until the problem is solved. The difficulty with this type of tool lies in the amount of time it takes just to document the device, time, customer, problem description, and the other

administrative information necessary to track the resolution.

We could make the engineer's job much easier if we could automatically open the trouble ticket and then fill in the administrative information. The engineer would then need only to start documenting the resolution.

To perform this function, we monitor the log file created by the monitoring software, in our example trapd.log. If a change is detected in the file, we filter the new entries for logs with the event ID we are monitoring for. If a log met the criteria, we would create a new trouble ticket with the device information, a textual description that matches the event ID, the time, and any other relevant information. Since we may want to monitor for different events on two of the same type of devices, we will also want to filter each network event for specific devices. Suppose, for example, we would like to monitor three workstations. Obviously, we would want to monitor them all for up/down status. In addition, if one of the workstations is utilized as a gateway, we would like to monitor the LAN traffic through it.

If we only filtered on the event ID, we would have trouble tickets generated every time any of the devices went down. However, since we are filtering only on the event ID, we would also get a trouble ticket each time any of the devices had a high level of LAN throughput. To overcome this problem, we could filter the log entries a second time for specific devices. Figure 3 illustrates this principle.

As can be seen from the illustration, only the logs matching the event ID and device name will cause the generation of a trouble ticket. A more sophisticated model would search the trouble

ticket database for similar solutions and then invoke a process that would correct the problem. If a match could not be found, the system could search a database of engineer profiles and then assign the trouble ticket to an engineer with the expertise required.

In any of the models we implement, we will have to accommodate scheduled maintenance.

Scheduled Maintenance

In an ideal world computers would never need maintenance. Unfortunately, for network and system engineers, the real world is far from ideal. Network devices are routinely being removed from service for upgrades, patches, and repairs. These outages are normally scheduled so that they have the least amount of impact on the users dependent on the devices. These "scheduled outages" are often the cause of false alarms. If the outage is not documented in a manner easily accessible by the network engineers performing the monitoring, a new trouble ticket will be opened and valuable engineering time will be wasted. To prevent this from occurring, we will create a database of scheduled outages. Each time a trouble ticket is created, we will search the scheduled outage database to determine if the device is scheduled to be down. If a match is discovered, we will indicate so in the trouble ticket and the engineer can close the ticket. We will avoid closing tickets automatically to prevent network events unrelated to the scheduled outages from being dismissed. The diagram in Figure 4 integrates this principle into our environment.

One can further simplify the process by automatically loading the scheduled outages periodically, using e-mail or some



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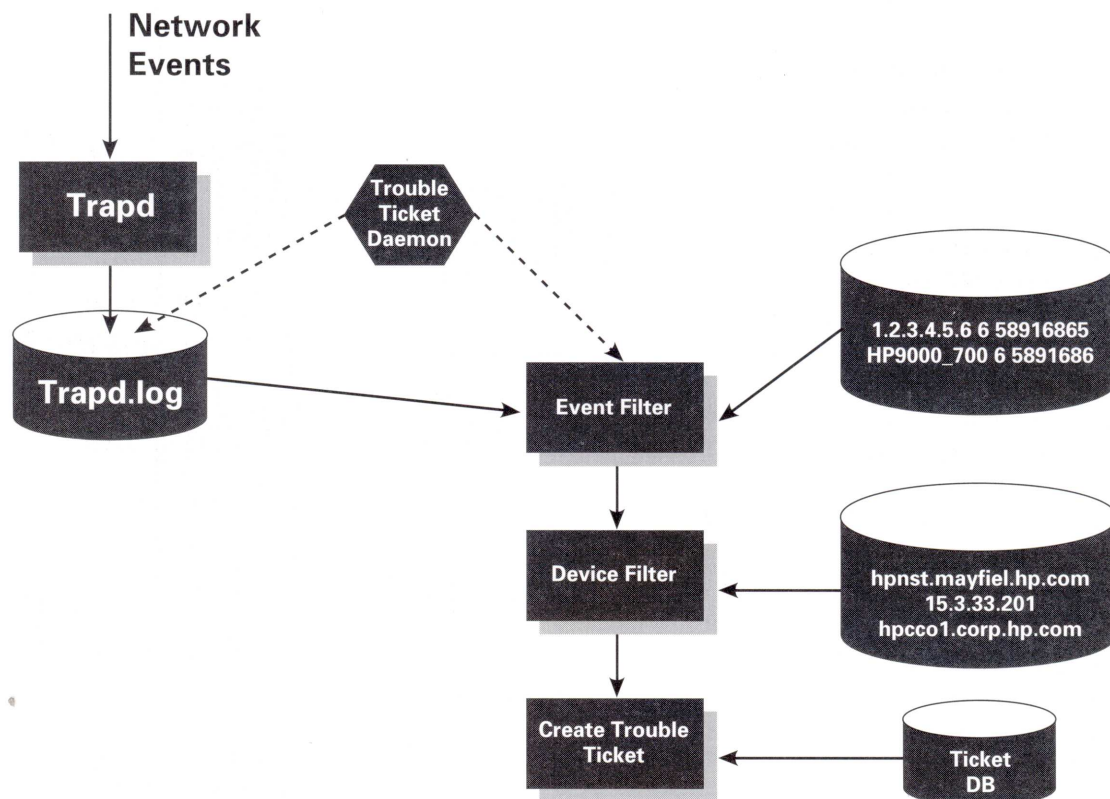
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FIGURE 3 Automatic Ticket Generation

other electronic mechanism. We now have a management station that monitors network events, collects device statistics, and automatically creates trouble tickets. We now need a mechanism that will correlate and report the information.

Report Generation

Our environment is now configured to collect and log all network events we are monitoring. Each time a qualified event is detected, a trouble ticket is generated. If a scheduled outage is associated with a trouble ticket, it is duly noted

on the ticket. Using this information, we can generate a number of useful reports.

To simplify the report generation process we will load all of the event logs, statistics, and trouble tickets into a database. This step can be avoided if the trouble ticketing and monitoring systems all utilized the same data store.

The first and probably most important report we can generate is the device availability report. This report will tell us the percentage of time that a device was reachable via the network during a given time period. We determine

availability by computing the total amount of time in the specified time period, then subtract the amount of time spent in outages. An outage can be determined by subtracting the time of a "Node Down" event for a given device, from the next occurring "Node Up" event.

We can enhance this report by indicating what percentage of the outages were scheduled maintenance. For those outages which were not scheduled, we could print the problem description field from the trouble ticket, to indicate why the availability percentage was low. Figure

5 illustrates a sample report.

Using the trouble ticket information we can also generate reports on the types of problems certain devices have been experiencing. From this data we can determine the need for hardware, software, and training. For example, suppose we noticed that we were getting a large number of trouble tickets for a particular device, with the problem description "disk space threshold exceeded." Using this data we could determine the need for a new disk, or justify the purchase of data compression software.

Since we are now generating the trouble tickets as the events occur, we will have accurate statistics as to the length of time between problem detection and problem resolution. From this information we can accurately determine staffing levels and measure the impact of process improvement tools.

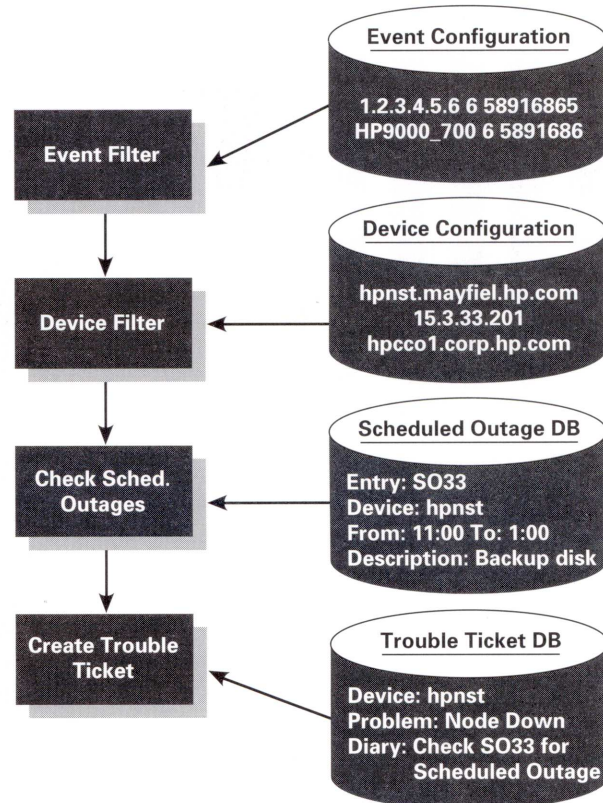
Now that we have established a solid management environment, we will examine how we can successfully integrate other tools.

Adding New Tools

As companies migrate to a distributed computing environment, there is a growing concern as to how to manage these distributed computers. A number of companies have developed system management tools to meet this need.

The true test of our environment will be the ability to add new tools and have those tools generate trouble tickets. To achieve this goal we will integrate new tools at the source of our trouble tickets, the event stream. If the new tool generates SNMP events when problems occur, then we can use our existing process without modification. It would be a matter of configuring our trouble ticketing daemon to generate tickets on

FIGURE 4 *Scheduled Outage Verification*

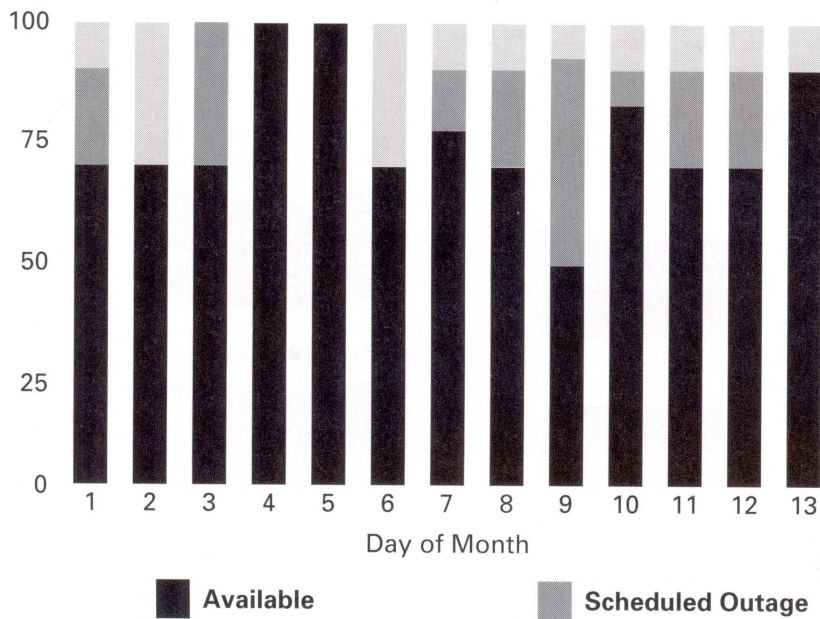


the new events. If the tool does not generate SNMP events, we have the following options:

1. Encapsulate the output of the tool and generate our own SNMP events.
2. Start another trouble ticketing daemon

to monitor the output of the tool and then generate trouble tickets.

Either of the choices requires that the new tool provide the device identifier, the time the event occurred, and a unique description of the event. All the

FIGURE 5 Device Availability Report

monitoring tools that run on the OpenView platform provide this information. In fact, most of them provide the ability to generate SNMP events and could therefore be integrated with only configuration changes. The following scenario will demonstrate this principle using a system management tool.

Suppose we want to integrate a system management tool into our model environment. The tool will have a controlling process at the management station that allows operators to send commands to the remote systems. The controlling process will also have a mechanism to receive events from the remote systems when problems develop. On the remote system would be an agent process, responsible for executing the commands sent to it by the controlling process and notifying the controlling process of any problems.

If a remote system was having problems, the agent process running on it would notify the controlling process using any communication protocol. The controlling process could then use the same model as the "netmon" daemon. The controlling process would generate an SNMP trap with a unique event id and send it to the "trapd" daemon. The trapd daemon would log it

to the file trapd.log. Our trouble ticketing process would detect this new entry and then filter it. If the entry met the criteria established by the event and device filters, a new trouble ticket would be created.

If the tool did not generate SNMP traps, then we could have our trouble ticketing daemon monitor the log file it creates. The device filter would remain the same; the event filter would use the same identifiers as the system management tool.

It is clear that our environment can accommodate any network or system management tool that generates a log entry with the device, time, and a unique event ID.

Conclusion

In this article we have examined how to integrate network monitoring, problem resolution, and reporting tools. We have demonstrated how the successful integration of these tools can simplify the network engineer's job. We have also examined how new tools can be added to the environment without significant effort.

Although we used HP OpenView in our model, the architecture discussed could be applied to any network management environment. ■

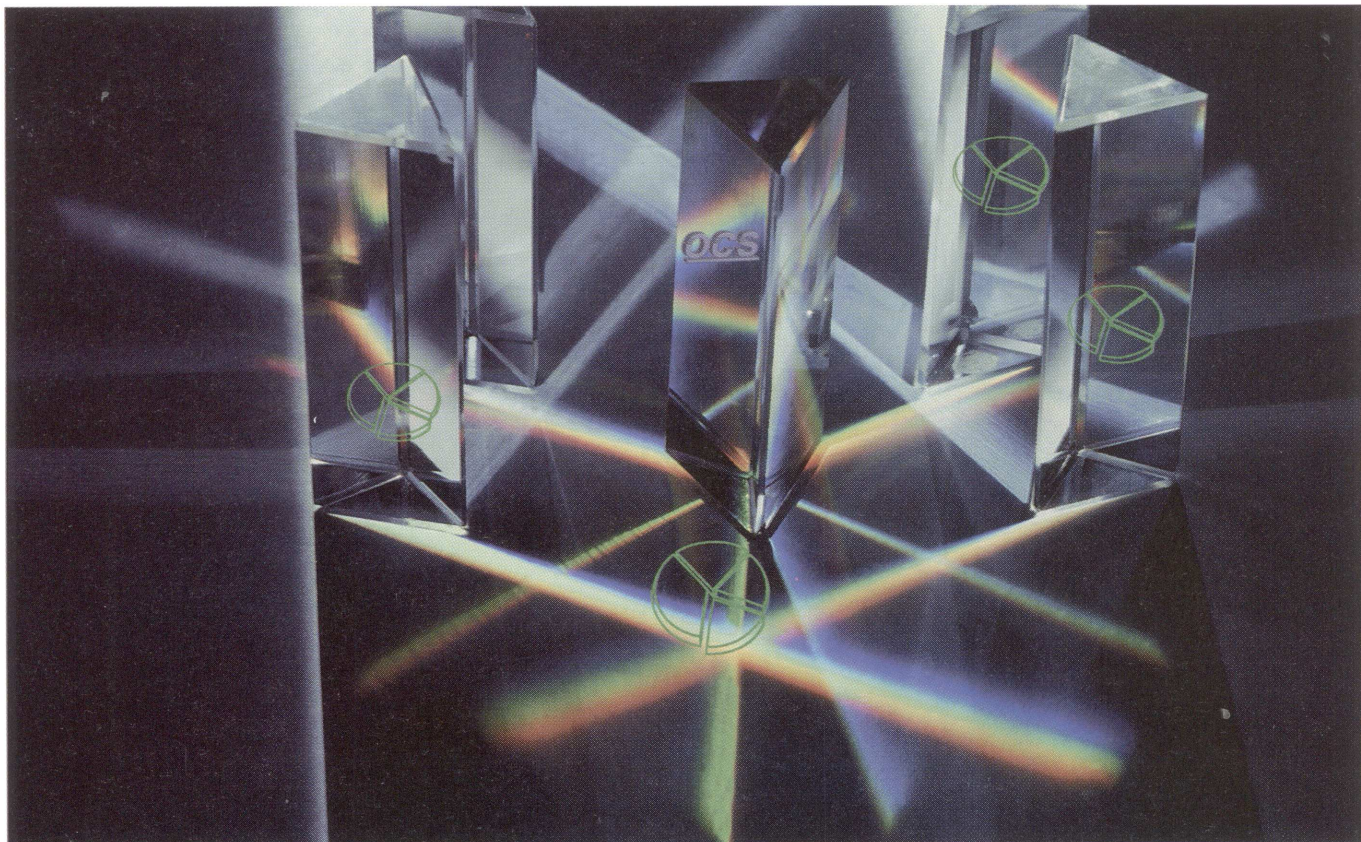
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AN HP-UX VERSION OF THAT FAMOUS ABBOTT AND COSTELLO ROUTINE

by John A. Pezzano

The customer calls the UNIX Consultant with a question:

Customer—What is the command that will tell me the revision code of a program?

UNIX Consultant—Yes, that's correct.

Customer—No. What is it?

UNIX Consultant—Yes.

Customer—So which is the one?

UNIX Consultant—No. **which** is used to find the program.

Customer—Stop this. Who are you?

UNIX Consultant—Use **who am i** not **who r yoo**. you can also **finger yoo** to get information about **yoo**.

Customer—All I want to know is what finds the revision code?

UNIX Consultant—Use **what**.

Customer—That's what I am trying to find out. Isn't that true?

UNIX Consultant—No. **true** gives you **0**.

Customer—Which one?

UNIX Consultant—**true** gives you **0**. **which programname**.

Customer—Let's get back to my problem. What program? How do I find it?

UNIX Consultant—Type **find / - name it** to find **it**. Type **what program** to get the revision code.

Customer—I want to find the revision code.

UNIX Consultant—You can't **find revisioncode**, you must **what program**.

Customer—Which command will do what I need?

UNIX Consultant—No. **which command** will find **command**.

Customer—I think I understand. Let me write that.

UNIX Consultant—You can **write that** only if **that** is a user on your system.

Customer—Write what?

UNIX Consultant—No. **write that. what program**.

Customer—Cut that out!

UNIX Consultant—Yes. Those are valid

files for **cut**. Don't forget the options.

Customer—Do you always do this?

UNIX Consultant—**du** will give you disk usage.

Customer—HELP!

UNIX Consultant—**help** is only used for Source Code Control System (SCCS).

Customer—You make me angry.

UNIX Consultant—No, I don't **make me** angry but I did **make programname** when I was upset once.

Customer—I don't want to make trouble, so no more.

UNIX Consultant—No **more**? **which** will help you find **more**. Every system has more.

Customer—Nice help! I'm confused more now.

UNIX Consultant—Understand that since **help** is such a small program, it is better not to **nice help**. And **more now** is not allowed but **at now** is. Unless of course **now** is a file name.

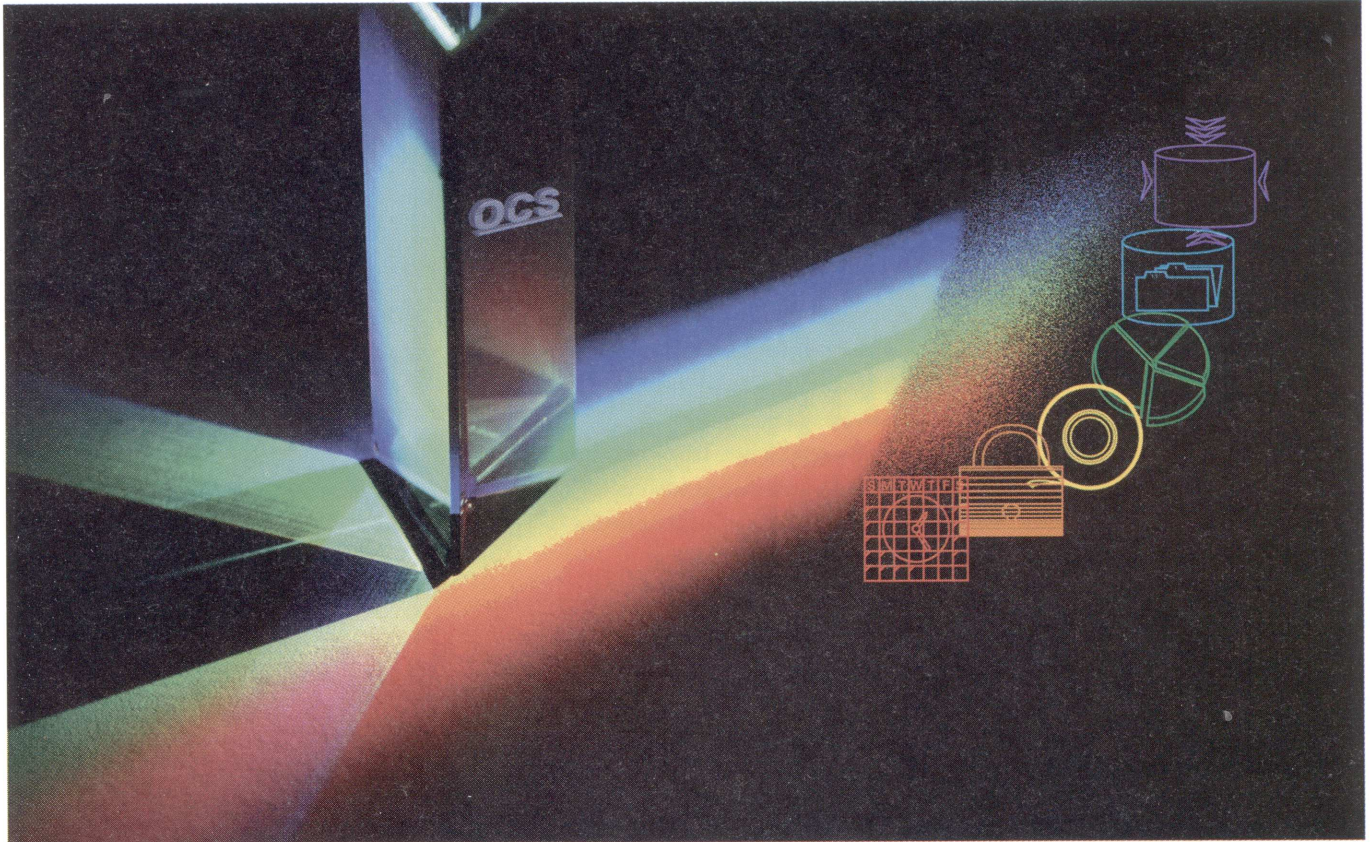
Customer—This is almost as confusing as my PC.

UNIX Consultant—I didn't know you needed help with **pc**. Let me get you to the Pascal compiler team.



Illustration by Nea Bisek

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Customer—This sounds like bs to me.

UNIX Consultant—No. **bs** is a compiler/interpreter.

Customer—I have had enough. I'll see you get punished.

UNIX Consultant—**cu** has numerous options but none of them will do what **bs** does.

Customer—Man, this has been some experience, but according to my Timex, it is time to leave on vacation. I just can't wait to split and get out of here so I can sort out what you said and clear my head of UNIX. I'd better just read the manual. Are other users who call as confused as I am?

UNIX Consultant—**man, sum, uniq, timex, time, leave, vacation, wait, split, get, sort, what, sed, head, read, users, as.** Do you want information on all these commands?

CLICK!

For those who are not familiar with the commands above:

as—assembler

at, batch—execute commands at a later time

bs—a compiler/interpreter for modest-sized programs

cu—call another (UNIX) system; terminal emulator

cut—cut out (extract) selected fields of each line of a file

du—summarize disk usage

find—find files

finger—user information lookup program

get—get a version of an SCCS file

head—give first few lines

help—ask for help

leave—remind you when you have to leave

make—maintain, update, and regenerate groups of programs

man—find manual information by key-

words; print out a manual entry

more, page—file perusal filter for crt viewing

nice—run a command at non-default priority

pc—Pascal compiler

read—read a line from standard input

rusers—determine who is logged in on machines on local network

sed—stream text editor

sort—sort or merge files

split—split a file into pieces

sum—print checksum and block or byte count of file(s)

time—time a command

timex—time a command; report process data and system activity

true, false—return exit status zero or one respectively

uniq—report repeated lines in a file

vacation—return "I am not here" indication

wait—await process completion

what—get SCCS identification information

which—locate a program file including aliases and paths

who—who is on the system

whoami—print effective current user id

write—interactively write (talk) to another user

John A. Pezzano is an HP Response Center engineer in Atlanta, Georgia. Before moving to Atlanta, he spent seven years as an SE in the HP office in El Paso, Texas, supporting HP-UX systems.

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CIRCLE 69 ON READER SERVICE CARD

by David Totsch

Fancy Shell Prompts

NOT LONG AGO, A SOPHISTICATED shell user asked me if the current time could appear as part of the shell prompt. I immediately made sure he did NOT want to sit and watch the prompt change with the time. I was assured that the time the prompt appeared would suffice. I even made sure this was not a solution for seeing how much time elapsed during the execution of a command.

For those using `csh(1)`, getting the prompt to change with the environment is not a big task. I have seen it keep track of things like the number of commands executed and the present working directory. On a typical system, a user's prompt is the machine name and login id, if the system administrator resets it from the default at all. My user's request posed a reasonably difficult question in that I use `ksh(1)` myself, and I had convinced this particular user to do the same.

The problem amounts to this: reset `PS1` to the current time after executing each command. After pondering this for awhile (I will not admit how long), I remembered that `trap` has a signal called `DEBUG` (signal 33). This is close to a notification of command completion. My solution:

```
trap 'PS1="`date +%x@%X`"> "' DEBUG
```

I put this in the user's `.profile` so that it takes effect at login. I wanted to take this a little further and add the present working directory, but since we use HP VUE, I decided to put the path name in the title bar of the `hpterm(1X)` window.

I had kept a copy of shell from `comp.sys.hp` on the Internet that sets the title bar of an `hpterm(1X)` window, so I knew how to set the title. Now I needed a way to set it each time there was a directory change. After some testing, I ended up with this:

```
function myfn_cd
{
    cd $*
    echo '\033&f0k'\`expr length "${PWD}"`"D${PWD}\`c"
}
alias cd="myfn_cd"
```

There are some caveats, two of which are:

1) `(cd /usr/spool/uucp ; ls)`

My window title now claims I am in `/usr/spool/uucp` when I actually never changed directory at all.

2) `xterm`

You can start an `xterm` from an `hpterm`. The `xterm` window will not respond well to the codes intended for an `hpterm`.

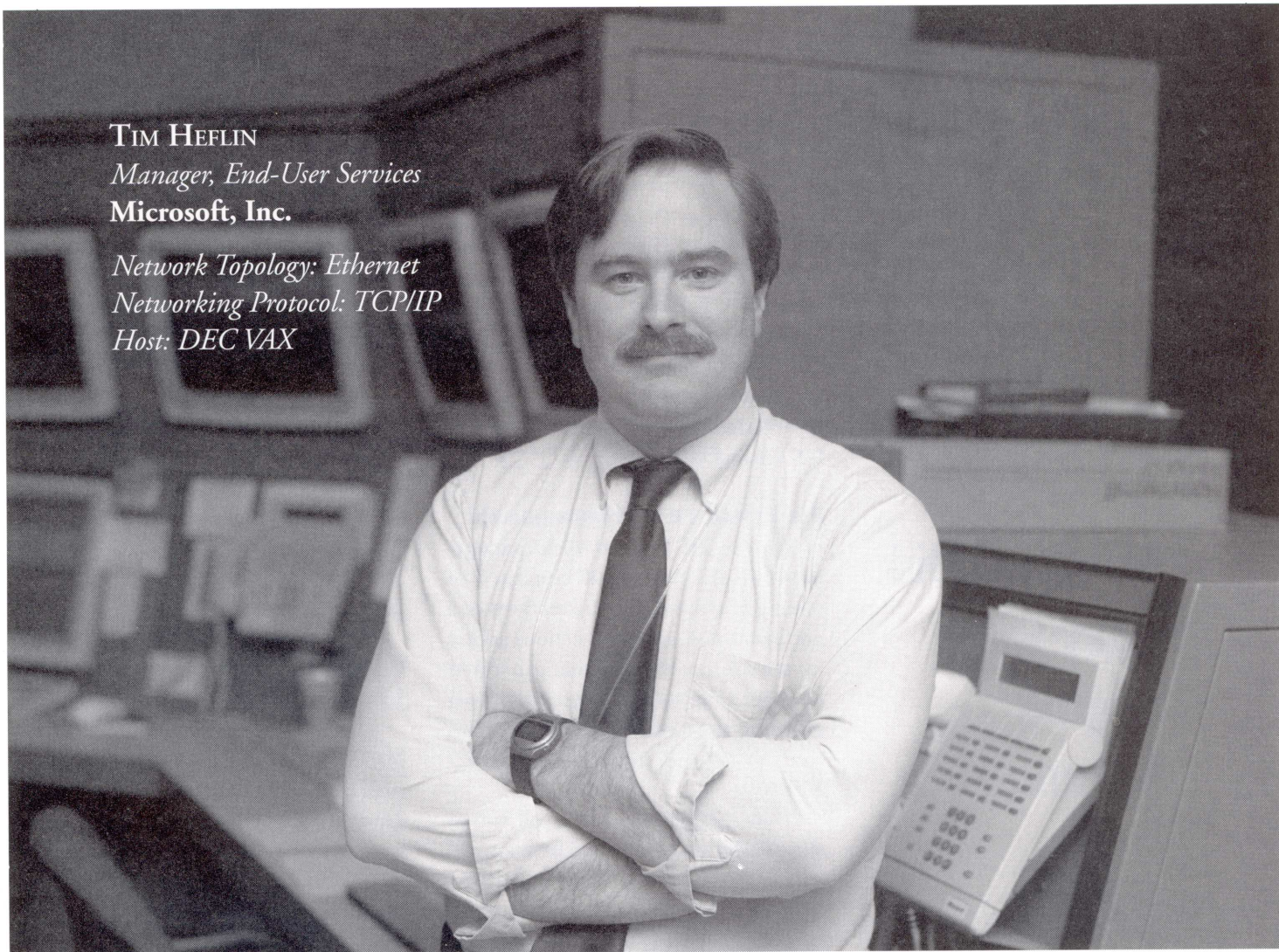
I have intentionally not supplied you with a complete and robust solution to the problems to get you to finish the work. Yes, I could supply you with a nice cookbook solution, but what fun would that be for you? ■

David L. Totsch is lead technical specialist at LaSalle National Bank, Treasury Systems, Chicago, Illinois.

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CIRCLE 70 ON READER SERVICE CARD

Managing Disk Space with Logical Volumes

ONE OF THE NEW FEATURES introduced with HP-UX 9.0 is Logical volumes. Logical volumes are a new way (for HP-UX users) to manage disk space. They are available only for Hewlett-Packard 9000 Series 800 computers and with HP-UX 9.0 and later.

Pre-HP-UX 9.0 Disk Management

Prior to HP-UX 9.0, disk management on the Series 800 consisted of mixing and matching the sections of a particular disk until the sections added up the size you thought that you would need for a file system. There was lots of guessing (and praying) that the sizes you chose would meet your needs for a while.

If you had only one disk, you had to choose the swap section, the root section, the /usr, and /users sections from the list of combinations available. What usually happened was that the disk layout would not meet your needs and you would have one or more small file systems that were virtually unusable.

A good example was dividing up a 1.2-gigabyte drive on an 827 with 48 megabytes of RAM. We needed about 100 megabytes of swap, 75 megabytes for /users, and the rest for root and /usr. After trying every combination, I settled for a 120-megabyte swap section, a 65-megabyte /users directory, 1-gigabyte root disk, and a 24-megabyte /mnt directory. (Save the comments about the 1-gigabyte root disk. It used to be the only way to give a database enough room to grow. Logical volumes solve that problem!)

Until we upgraded that system to HP-UX 9.0 and Logical Volume Manager (LVM), that /mnt directory remained empty. The maximum amount of swap

space needed never went above 80 megabytes and the /users directory would fill up every other week. We wasted 40 megabytes in swap and 24 megabytes in /mnt and still had disk space problems.

Changing the size of a file system consisted of a full backup, reinitializing the disk, changing the file system sizes, and reinstalling all your data. This could be an all-day task on a large disk, so most people did not do it.

Welcome to Logical Volume Manager

One of the first things I heard about HP-UX 9.0 was that it had a new way of managing disks on the Series 800. After reading and hearing more about it, I wanted to install it.

What has changed is that HP-UX now looks at a physical disk as a group of smaller disk sections. Rather than dividing the disk into half a dozen variously sized disk sections, it divides the disk into fixed-size pieces.

Each piece is called a physical extent. This is the minimum size that a file system can be. Physical extents can be combined to create file systems of any size that is a multiple of the physical extent size and less than or equal to the size of the total disk. The size of a physical extent is defined when you create a volume group. The default size is 4 megabytes.

A volume group is a grouping of one or more physical disks. The volume group is then divided into logical volumes. One or more logical volumes can exist within a volume group. Theoretically a logical volume can consist of all of the disk space in a group. Technically the maximum size of a logical volume can be 2 gigabytes.



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CIRCLE 47 ON READER SERVICE CARD

The advantage of logical volumes is that you can specify the exact size of the file system you want to create. It only has to be a multiple of the physical extent. This is true for swap as well as for the file systems. You are also not required to use all the space in a volume group when you define your volumes. You can hold some back in reserve to be added to an existing volume when your space needs change.

You can also add disks to a volume group and use them to increase the size of your logical volumes. Suppose, for example, that you are running a database application and the database fills up its allotted disk space. Before logical volumes, you would need to unload the database to tape, either buy a bigger disk or repartition an existing disk, initialize the new disk space, and restore the database. With logical volumes, you can add a new disk to the volume group and increase the size of your database's volume. No unloading, initializing, or hours of downtime. You can also reduce the size of a logical volume, but it is not as easy as adding to a logical volume.

If you are planning to upgrade to HP-UX 9.0, I recommend that you do a fresh install. While HP supplies a migration path to logical volumes from the earlier format, you will probably want to take advantage of the new features to change your swap or root disk size.

You can keep disks that are in old format and use them side by side with the LVM disks. Also, there is no requirement that you use LVM. In fact that is what I have done on our development system.

When I performed the update, I had some tight time constraints. I decided not to go through a full install or risk something happening while migrating the root disk. Instead I left the disks in the older format. We are not really

missing anything since our disk formats do not change often.

I have installed about a dozen 800s with LVM and was very impressed with the ease of resizing volumes and adding disks to groups. When I do get some time to migrate my disks, I plan on taking full advantage of the features that LVM offers.

Administration of Logical Volumes

I will not get into all the commands and options that you have to work with logical volumes. HP has done an excellent job in producing a section in the *System Administration Tasks* manual. SAM also can be used for LVM management; in fact I recommend using SAM rather than the commands by hand.

One issue I do want to reiterate is backing up your LVM configuration. Unlike the old method, where sections were always in the same spot on disk, LVM places volumes anywhere there is space. The implication is that if you lose your configuration, you cannot get it back. In the old format, you could guess, if you did not remember, which sections were parts of your file systems. Look at the `vgcfbackup` and `vgcfrestore` commands and follow the backup advice in the *Systems Administration Tasks* manual to save yourself a lot of heartache.

comp.sys.hp Reorganization

In the July 1993 issue I recommended that users interested in HP-UX and Hewlett-Packard computers read the Internet news group `comp.sys.hp`. The last couple of years the volume in this group has steadily increased to the point that there are easily 40 or more messages a day in the group. On July 26, 1993 a Request For Discussion (RFD)

was issued for reorganizing the `comp.sys.hp` news group.

On the Internet there are two stages to creating a new news group or changing existing ones. The first is the Request For Discussion. When it is issued, the issuer suggests the name or names for the new groups and a description of what topics would be relevant in the group.

Once the RFD is issued, anyone who has anything to say about the changes is asked to speak his mind. During this period the RFD may be changed to address the concerns of users and suggestions about name and/or content changes.

The second stage is the Call For Votes. During this stage a "ballot" is sent to either a "Yes" or "No" e-mail address. If the number of "Yes" votes exceeds two-thirds of the "No" votes, the group or groups are created. Votes are usually taken for each of the groups, rather than an all-or-nothing vote.

On August 3, 1993 a second RFD was issued calling for the creation of the following groups:

- `comp.sys.hp.hardware`
- `comp.sys.hp.software`
- `comp.sys.hp.hpux`
- `comp.sys.hp.mpe`
- `comp.sys.hp.misc`

Each of the groups would be unmoderated, i.e., anyone can post anything they want. The misc groups would be a spill area for questions that do not fit into the other groups.

There was a large discussion about adding additional groups for printers, Vectras, RTE, and Instrumentation. These subjects are such a small volume of the current postings that they were not included at this time.

The Call For Votes was expected in the first week of September, with the hope of seeing the new groups by Halloween. I'll have an update in the next issue.

Thanks to all the people who have sent me e-mail and joined the discussions in comp.sys.hp and the HP-UX Patch mailing list. I am still looking for ideas for topics in this column and would like to hear feedback from the readers.

Tip of The Month: For CompuServe users: I have been told by several people that the HP Systems Forum is similar to the comp.sys.hp newsgroup and is an excellent source for information. Unfortunately I do not have a CompuServe account to check it out personally. ■

Chris Curtin, a software developer for Bradley Ward systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: chris@bwilab3.atl.ga.us.

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by Larry Headlund

My Favorite Things

WE ALL HAVE FAVORITE TOOLS. They might not have the most features and they might not be anybody else's favorite, but they work for us. Following are some Motif-based applications, tools, and contributed widgets that I have found particularly useful. It by no means includes all the useful things that are available for Motif, just a sample of the things I like.

Development Tools

1. Wcl—Widget Creation Library

by David E. Smyth

I covered Wcl in detail a couple of columns back. I just want to add that the new feature of templates in Wcl makes writing software components (which we all know is a good thing) the most natural thing in the world. Wcl is available under an X-style license. That is, you can do anything you want with it provided you acknowledge the copyright, including using it in proprietary code.

2. Winterp—Widget INTERPreter

by Niels Mayer

Not everyone works exclusively in C and C++. The natural mode for developing user interfaces is an interactive mode, which leads to considering an interpreted language. Lisp is the premier interpreted language. It has a long history (over 25 years and I wish I aged as well), a well-explored syntax, and that certain elegance. While it has been almost from its inception the preferred language for artificial intelligence research, Lisp has had the reputation of being too slow, too CPU intensive, and too demanding of memory for general use. This didn't keep a form of Lisp from being used as the extension language for the popular editor Emacs. These days we have a lot of compute power and

memory to use, and what better use than making programmers' lives easier? This is particularly true in constructing user interfaces, since the human half of the interface runs at a much slower clock rate.

Winterp is a Lisp (using David Betz's xlist) interface to Motif. Neils Mayer is an employee of Hewlett-Packard and I congratulate HP on making his work generally available. The author appears to be an Emacs fan and states that Winterp was strongly influenced by GNU-Emacs' successful design. He provides an interface to Emacs with the code and regards that as the preferred programming environment. If you are not an Emacs enthusiast (and I'm not), there is an example of an alternate mode of operation.

Even if you don't plan on using Lisp as your preferred delivery platform, Winterp is useful as a learning tool for X and Motif. The insights I gained by studying the examples and playing with the code serve me well every day.

Winterp is available under an X-style license.

3. Elk—Extension Language Kit

by Oliver Laumann

Lisp isn't for everybody. Scheme may be considered a dialect of Lisp, an alternate path of Lisp development (keeping the faith while "real" Lisp galloped off towards Common Lisp and the Common Lisp Object System [CLOS]), or as a student version of Lisp. That is, in its early history Scheme bears a similar relation to Lisp as BASIC to FORTRAN or Pascal to C. One good reason for learning Scheme is so you can read with purpose the excellent text *Structure and Interpretation of Computer Programs* by Harold Abelson and Gerald Sussman

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*The '94 Program Committee will consider proposals addressing topics that are not included in the list outlined here and encourages such submissions.

with Julie Sussman (Mit Press ISBN 0-262-01077-1, McGraw-Hill Book Company ISBN 0-07000-422-6, 1985).

A more important reason for learning Scheme is so you won't have to keep re-inventing embedded languages for your own use. Use Scheme instead. The prime example of re-inventing the wheel seems to be PostScript, which supposedly now has 90 percent of the functionality of Lisp! Oliver Laumann felt that a general-purpose version of Scheme designed to be used as an embedded language would serve a useful purpose, so he wrote Elk. The X and Motif interface serves as a "real-world" example of Elk as an embedded language. Elk is of course useful for non-GUI purposes as well.

Once again, Elk uses a non-restrictive X-style license.

4. siod (Scheme In One Defun)

by George Carrette

It's not a GUI tool, it doesn't even have a Motif interface, but if you want a very small and simple implementation of Scheme, this is where you turn. If you want to write your own interpreter, this is where to start.

5. Motif++—C++ interface to Motif

by Paul Felix

Obviously we are no longer talking about small and simple languages. Motif++ is based on the idea of providing C++ class "wrappers" for each Motif widget. The result is a set of classes that have convenient member functions for

- creating and managing widgets
- accessing and modifying widget resources
- handling widget callbacks

Note that Motif++ uses Wcl. With my prejudices that is a big plus (a double-plus?). If you need real Motif (not just look and feel) and your preferred environment is C++, this is the first place I would look.

Contributed Widgets

1. Xbae widgets from Bellcore

Bellcore is Bell Communication Research. They have released two Motif-compatible widgets under an X-like license.

The first widget is XbaeCaption. This widget is a simple Motif manager widget used to associate an XmLabel (caption) with its single child. The label may be either an XmString or Pixmap and can be displayed in any one of twelve positions around the perimeter of the child. So if you want to treat the label and the text as a single object, this is the ticket.

To my mind the real prize is the second widget, XbaeMatrix. This is a spreadsheet widget, but without a spreadsheet macro language. That is, XbaeMatrix is a Motif widget that presents an editable array of string data to the user in a scrollable table similar to a spreadsheet. The rows and columns of the Matrix may optionally be labeled. Also, a number of "fixed" leading rows or columns may be specified—these behave similarly to the labels. While XbaeMatrix looks and acts like a grid of XmTextField widgets, it actually contains only one XmTextField. This means that XbaeMatrix widgets with hundreds or thousands of rows have much less overhead than they would if they used an XmTextField for each cell. You can select rows, columns, and regions of the matrix and a set of callbacks is provided. I have found XbaeMatrix to be almost obscenely useful.

2. Term by Marc Quinton

Have you ever wished you could embed an xterm inside your program and have the operating system do the work? Term gives you xterm functionality in a Motif widget. As a bonus you get a Motif-compliant xterm-like client as an example program.

I have used Term along with Wcl to create Motif GUI wrappers for character-based applications, including applications for which I did not have the source.

Programs

I won't detail the copyright restrictions on the following programs. Most of them have X-type licenses, but in any case you can use and study them to your heart's content.

1. xterm-motif by Ivan M. Hajadi

This is a clone of the MIT xterm with the Athena widgets replaced by Motif widgets. You might like to contrast this implementation with the same effect using the Term widget.

2. Jedit by Duane Clark

Jedit is a Motif programmer's editor with features such as

- multiple undos
- find and replace
- go to line number
- tabbing in and out a block of text
- automatic C syntax sensitive indenting, which can be easily configured to suit the style you want, or disabled
- a clipboard with the ability to cut and paste between editors, even if they are running on different hosts

This is the editor I use in my day-to-day work and I am well pleased with it. I still go back to vi when I want to do a complicated find and replace, but that

may be because my fingers know the vi syntax without my brain's intervention.

3. Xrolodex by Jerry D. Smith

This is an electronic rolodex application, the one I use to keep track of my life. The code is particularly interesting because it is the basis for a book, *Designing X Clients with Xt/Motif* by Jerry D. Smith (Morton Kaufman Publishers, Inc. ISBN 1-55860-255-0, 1992). So this is code written to be read. The book itself is very useful and meets my definition of a good programming book: The author makes statements I disagree with. If I agreed with everything he says, he would be sticking to "apple-pie-and-motherhood" issues.

The book is not needed to use and enjoy the program.

4. Xmgr by Paul J. Turner

This is not a manager program. Instead it is a graphics plotting program par excellence. From a data file it can display polynomial regression, splines, running averages, DFT/FFT, cross/auto-correlation, etc. I have even used it to display two-dimensional views of objects. It includes the ability to print to PostScript printers.

Before you look at any plotting package, free or commercial, check this out.

This just scratches the surface of the resources available to Motif developers and users. New tools are being added all the time and I have no doubt that there are wonderful programs out there that I haven't seen yet. If you know of any you particularly like, let me know. ■

Larry Headlund is president of Eikonol Systems and has been working with commercial UNIX since 1982, with HP-UX since 1984, and with X since 1988. He can be reached at (617) 482-3345 or lmh@world.std.com.

Xfrm

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- ext:** (empty)
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- State:** NJ
- Zip Code:** 01234-5678
- Products:** A grid of checkboxes for Xfrm, MFORM, QREPORT, MAXS+, QFORM, QRCRIVE, PGRAF, QUESTOR, and MKPGRAF.
- System:** A grid of checkboxes for HP-UX, RTE, 4mmDAT, CS90tape, and Media.
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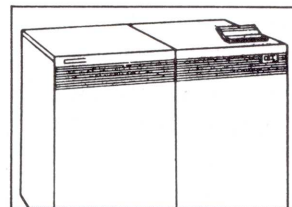
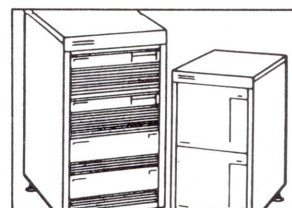
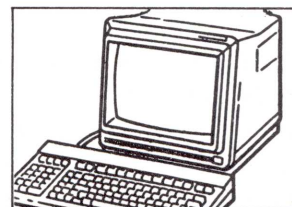
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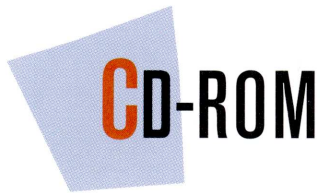
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CIRCLE 18 ON READER CARD



by Bill Hassell

Version ID for MSCDEX

HERE IS AN EASY way to find out the version of your MSCDEX file. Use the DOS command DIR in the directory where MSCDEX.EXE resides and have a look at its file size:

MSCDEX Version	Size (bytes)
1.01	14,913
2.00	18,307
2.10	19,943
2.20	25,413
2.21	25,431
2.22	25,377

MSCDEX reports its version number when it starts, but this requires a CD-ROM driver and the proper startup sequence; otherwise, there isn't a mechanism to interrogate MSCDEX.EXE as a stand-alone program.

LaserROM and HP-UX Application Updates

LaserROM (documentation on CD) has been shipping on a monthly schedule to our contracted customers since it was launched as a new product. This schedule was great for the customer and great for HP. It allowed HP the time to get its manuals changed over to LaserROM, and it allowed the customers to receive updates on a regular basis as HP migrated to LaserROM.

Recently HP has received many complaints that receiving the CD on a monthly schedule is no longer adding value. Since HP has migrated most of the manuals to the CD, and very few of them change on a monthly basis, HP has decided that going to a bimonthly schedule is better.

In August HP changed to a bimonthly schedule. HP-UX English and HP-UX Japanese ship in the same month as application discs. When there is a large

release such as HP-UX 10.0, HP will tie the LaserROM into the release timeline and create an additional CD that will be shipped when the release ships.

New Vectra CD-ROM Drive

Long-time readers of the CD-ROM column will remember that HP stopped shipping an internal CD-ROM drive a couple of years ago. Since then, the only HP solution was the C2226A (a Toshiba 3301 drive) in a C226x tower, a solution that could be a bit expensive.

Starting this fall, a new product is shipping: the D2886A, which is a double-speed drive with a caddyless design. This means that the caddyless versions will not be able to run sideways. Mostly, this means that desktop Vectras that are placed sideways on the floor won't be able to use this drive, but then, a desktop model is for a desktop! HP sells floor model towers for this application.

The D2886A has a 64K internal buffer and uses SCSI-1 commands. The drive also supports Kodak's Photo CD multi-session modes.

Note that the CDR-55 lacks parity capability so this will have to be disabled on the SCSI card via driver or switch settings. Also, the CDR-55 does not have disconnect and diag features, which might slow down other disks on the same bus. It's not recommended to put other devices on the same bus as the CDR-55.

Multidrive CD-ROM Recorder

JVC has announced a multi-drive system in which up to five ROM-writers can be placed in a single cabinet. The TW-3011B can produce up to 100 CD-ROMs per hour (using all five drives) on an EISA workstation and as many as 25 per hour on a standard bus (ISA) PC. The basic package runs about \$14K with one

CD-ROM writer and includes the PC software. Additional drives are \$4,200 each. JVC is at (714) 965-2610.

List of Double-Speed Drives

Ever since Toshiba, NEC, and Pioneer announced higher speed CD-ROM drives, the CD-ROM world has rapidly migrated to the double-speed capability. It turns out that spinning the disc faster is a lot easier than decreasing the seek time. Remember that because of the audio heritage of CDs, the disc spins at different RPMs, depending on which part of the disc is to be read. This keeps the audio sounding correct (data is always recorded at the same density from inner to outer tracks), but simply slows the data rate down for CD-ROMs.

In addition, Photo CD and multisession Photo CD are becoming standard for every new drive. Here is a partial list of drives, retail prices, and manufacturer's phone:

Chinon America (800) 441-0222

CDS-535 \$645 (internal)

CDX-535 \$795 (external)

Laser Magnetic Storage (719) 595-7900

CM206 \$499 (internal)

NEC Technologies (800) 632-4636

CDR-84 (typ. street: \$515) internal

CDR-74 (typ. street: \$615) external

CDR-38 (typ. street: \$465) portable

Pioneer New Media Technologies (310) 952-2111

DRM-604 \$1,845 (external, 5 CD changer)

Sony (800) 352-7669

CDU-561 \$649 (internal)

Texel (800) 886-3935

DM-3024 \$499 (internal)

DM-5024 \$599 (external)

Toshiba America (800) 334-3445

TXM 3401B \$695 (internal)

TXM 3401E \$895 (external)

TXM 3401P \$995 (portable)

All of the above drives are advertised with 200-300 ms average access time, except for the NEC CDR 38 portable, which is 400 ms.

Super Low-Cost Double-Speed Drive

Look carefully at the Panasonic CR-562B. It's a brand new drive from Panasonic that has been seen at some local

computer expos. Reports state that it is double-speed, MPC-2 (a new MPC standard), with 320 ms access time, Photo CD compatibility, and a 300K transfer rate. It is also caddyless!

The niftiest part is that it works with SoundBlaster cards that have a CD-ROM interface. The SoundBlaster has always had a proprietary Panasonic interface, so it hasn't been commonly recommended as a CD-ROM interface.

What this means is that you can now have a state-of-the-art CD-ROM drive plus an audio card and use only one slot. A good source for this drive is CD-ROM Access (about \$240). Indications are that these drives are going as fast as they arrive. Check with your local dealers on price and availability. They may have deals on the drive and SoundBlaster Pro interface card.

Fixing Those Scratches

The bottom layer (clear side) of a CD or CD-ROM is polycarbonate plastic, the same stuff that's used in bulletproof windows. But it will scratch and since the tracks on a CD are much smaller than human hairs, these can lead to an unreadable disc. The following is anecdotal information about how to polish a CD, but if it's not readable, you might give one of the ideas a try.

Try Crest toothpaste. It seems to work well as a polishing agent. **DON'T USE A TOOTHBRUSH!** Just a small lint-free cloth, something you might use on a camera lens—no paper towels or tissues. Try rubbing in radial directions (i.e., at right angles to the tracks) rather than circular motions. Errors are correctable if they are short, relative to the track.

There are some silver polish cloths that have a very fine rouge embedded in the cloth. Try some strokes from the center towards the outside edge to smooth out a scratch.

Try a scratch remover for motorcycle windshields or aircraft windshields. Be sure that it is a scratch remover and not just a polish. Once the scratch seems to disappear, swab the surface with a non-solvent based cleaner (soapy water).

Try methylated spirits (i.e., denatured alcohol) and a small Q-tip. Since the cotton swab is somewhat abrasive, do not apply much pressure and keep the swab moving at right angles to the tracks, along a radial line from the center. Scratches seem to disappear slowly (after about five minutes of wet swabbing). ■

Bill Hassell is an HP-UX system support engineer at the HP Atlanta Response Center. He can be contacted at his e-mail address, which is blh@hpuerca.atl.hp.com.

Advertiser's Index

Please call or fill out adjacent card for further product information.

READER SERVICE NUMBER	ADVERTISER	PAGE #	READER SERVICE NUMBER	ADVERTISER	PAGE #
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63	Bering Industries Bering provides a complete line of tape drives, removable cartridges, fixed hard drives, and combination subsystems for HP 9000, 3000 and 1000. Phone: (800) 237-4641/ Fax: (408) 374-8309.	75	80	KL Group Inc. KL Group develops XRT Products for X Window System developers. XRT/graph and XRT/3d are sophisticated graph widgets that can be used to create any type of 2-D or 3-D graph. Phone: (800) 663-4723 or (416) 594-1026/ Fax: (416) 594-1919.	87
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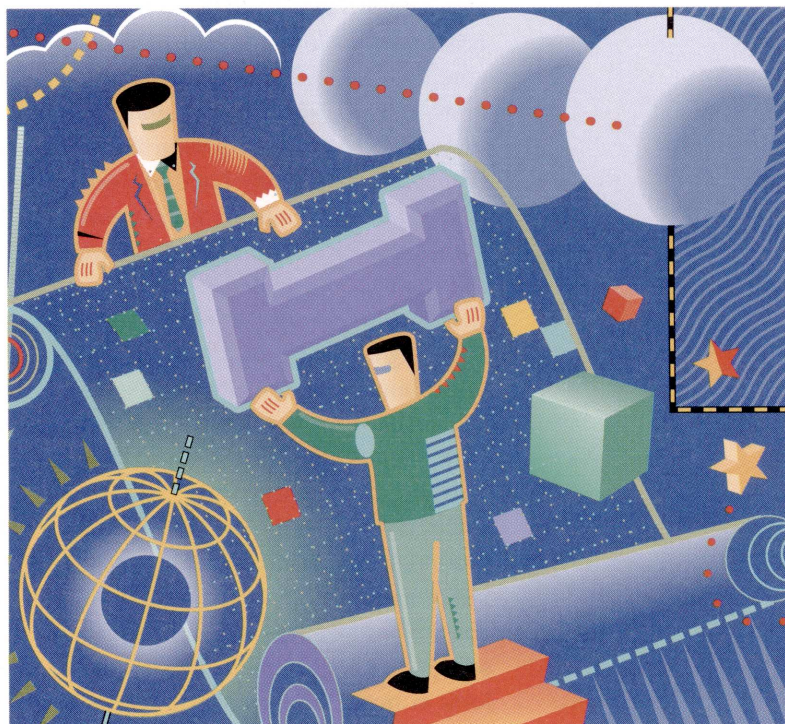
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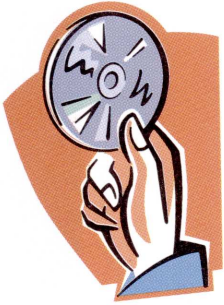
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CSL/HP-UX

ONE OF THE MORE enjoyable parts of my job is being one of the first administrators to install a new release of software from a vendor. It's really exciting to play with the new capabilities and to see the bugs that you had uncovered repaired. There is also a certain level of satisfaction in knowing that your vendors are committed to improving their products despite the enormous costs associated with support.

It's the same way with the freely available software that I pull down from the network. After running some of this software, I am amazed at the abilities of these developers to produce such useful and sometimes revolutionary contributions. Sometimes I actually have to decide amongst several similar packages because the authors have slightly different ways of solving the same problem.

It is this spirit of creativity, tenacity, and exploration that enables the Contributed Software Library to survive. Without a steady stream of useful software, we would wither away and be forgotten. This past spring, the fifth CSL/HP-UX was shipped to members around the world. It contains 53 contributions with over 100 MB of files. This was the first release I had to build from start to finish. Therefore I was able to look at many of the contributions in detail. From what I saw, our CSL is continuing to improve in both quality and quantity. We had three objectives with this release:

1. provide information-sharing software to increase the HP-UX members' ties to the larger UNIX/open systems community.
2. continue to provide tools for system administration.
3. expand the CSL's offerings in the areas of migration and co-existence.

I am happy to say that this year's release has met these objectives. Let me give you a taste of some of the excellent contributions.

USENET News

USENET is a worldwide network of systems and users where information is shared on practically any topic you can imagine. You could draw the analogy to your favorite BBS system, but it is *much* larger (40 MB per day) and the information is delivered to you locally, without your having to dial into a networked node. The CSL provides all the basic software you need in the contribution *c-news*. Once it is installed, and you are connected to a neighboring upstream feed site, you can read and post articles and begin to reap the benefits of sharing with millions of users. There is also a contribution called *nntp* that provides a TCP/IP transport for the server as well as your favorite news reader programs such as *xrn* and *m* (to be included on the San Francisco Swap tape).

X Window System Support

In previous releases of the CSL, there have been contributions of the MIT X11 software as well as many utilities and applications. What has been lacking is a method to load the client applications without having to have the entire X release on your disk. On this release two contributions, *Xaw_Xmu_libs* and *imake-4.00*, now provide that capability. The former provides the libraries and header files that are part of the MIT release but have unfortunately been excluded from the HP releases. The latter provides the utility *imake*, which can be thought of as a "compiler of Makefiles." Its biggest advantage is that developers of X applications can generalize the compilation

and installation procedures regardless of the underlying operating systems. With *imake* configured, an X application can be compiled, linked, and installed on most UNIX systems without making any changes to the code.

Imake was recently featured in Larry Headlund's X-WATCH column in the January and February 1993 issues of *Interact*.

System Administration

We have been honored to have Hellmuth Michaelis from Germany submit several very useful utilities for system administration including *mtstat* (get mag-tape status), *getethers* (get Ethernet addresses of network), and *xntp* (network time protocol). In addition, David Totsch sent two small utilities that will help in managing the password file. I have also included the latest version of the Perl language and a large collection of Perl scripts, many of them useful for administration. Perl is an amazing piece of work, and it is gaining in popularity as a general-purpose scripting language. Many groups are using it extensively in mission-critical shops.

Over the coming year, the CSL/HP-UX committee will be continuing to pursue the objectives of providing a timely and useful library for our members. If you or your organization has specific needs, please let us know. We just may be able to find something.

Finally from all of us in the CSL committees, Happy Holidays. ■

Paul Gerwitz is chairman of the CSL/HP-UX committee and is a system analyst at Eastman Kodak Company in Rochester, New York. He can be reached at 716-477-3067 or e-mail at gerwitz@interex.org or gerwitz@kodak.com

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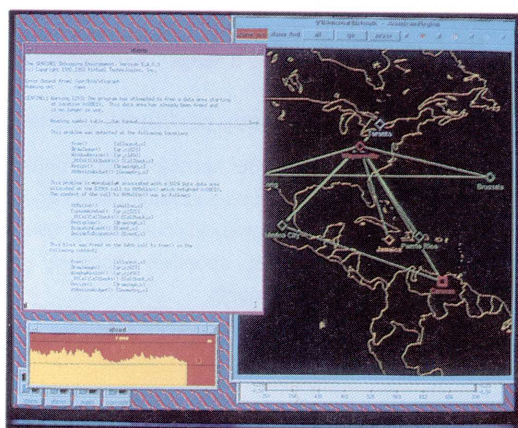
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Memory Access Debugging Tool



SENTINEL is shown debugging network management software under X Windows

THE X WINDOW SYSTEM HAS brought to UNIX computing environments a certain level of user-friendliness as well as gains in productivity. Unfortunately, it has also created an environment vulnerable to hidden bugs, particularly in memory, according to Conor P. Cahill, President of Virtual Technologies, Inc. (VTI). Now VTI is offering a new version of SENTINEL, said to be the first memory access debugger for UNIX C, C++, and X Window environments.

The recently announced Version 1.4 operates on HP 9000 Series 700 workstations and Series 800 business servers. Version 2.0, scheduled for release in November, will add integration with HP's SoftBench to SENTINEL's list of features.

SENTINEL is a library of routines that can be linked into UNIX C and C++ programs to trap memory errors, report on

the source file, function name, and line number of the memory allocated, and, if applicable, report on where memory was freed or overwritten. Users can stop the program during runtime to correct discovered errors.

Cahill believes debugging products such as SEN-

TINEL will become more important in software development because, "with the advent of X Windows, [detection of] memory access errors becomes more important." He explained that non-X Window systems require users to exit out of one application before they enter into another. Closing one application automatically deletes corrupt data and

prevents other applications from accessing it. However, in the X Window System, "if you're in a word processing application and want to pop into the database, you just open up another window." And activating multiple sessions creates "much more of a chance of causing resource problems," Cahill said.

Increasing use of computers in critical operations and users' subsequent demand for high-quality debugging tools has prompted VTI to offer more features in Version 1.4. The new version improves upon Version 1.3.2 with greater ease of use, providing for the software to configure itself automatically with the software to be debugged. According to Cahill, all the user needs to do is type the word "sentinel" before the program link command.

The new version also boasts an increase in performance, particularly for X terminal users, since "80 to 85 percent of our customers are doing X windows development," said Cahill. The number of functions checked by the debugger has increased from 30 to 150, and functions for checking memory leaks have been enhanced.

In addition, the entry report now lists only those memory allocation entries that cannot be referred to. Cahill called this "reducing the signal-to-noise ratio." He noted that most of the entries that show up on the report are valid memory allocation errors. Another enhancement to reporting features is the e-mail option, which lets users send debugging reports to a specified list of recipients. Non-developers testing software can send the technical information to the programmers who use it instead of having it appear on their screen during testing.

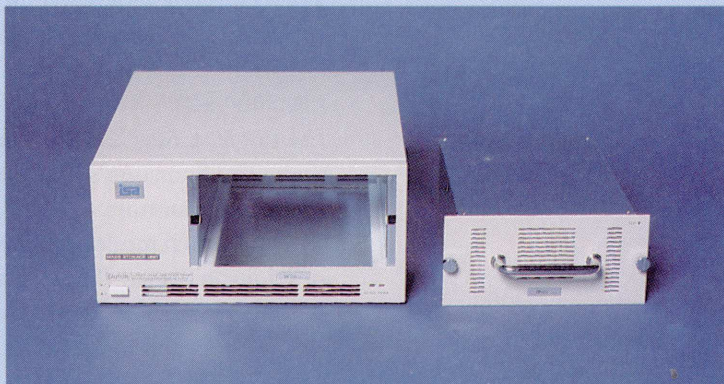
Although Version 1.4 is still fairly new, VTI is already announcing Version 2.0,

scheduled for release this month. Cahill noted that two major changes will occur with Version 2.0: the addition of a GUI and the product's integration with SoftBench. Integration with SoftBench will allow SENTINEL to communicate with other tools in the SoftBench framework. Cahill expressed great expectations from SENTINEL integration with SoftBench, describing use of applications within SoftBench as "all magic as far as what is going on with the user; it looks to the user that all these tools were meant to run together." By integrating SENTINEL with a text editor, for example, users can drill down into the error messages for a detailed explanation of the code error and then rewrite those lines of code while still in SENTINEL.

The SENTINEL debugging environment for HP is priced between \$695 and \$995, with volume discounts available. It is platform-specific, depending on machine class. Contact Virtual Technologies, Inc., 46030 Manekin Plaza, Suite 160, Dulles, Virginia 20166, ph: (703) 430-9247, fx: (703) 430-4560. ■

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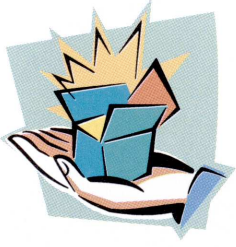
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CIRCLE 54 ON READER SERVICE CARD

*Michelle Pollace is the New Products editor
for hp-ux/usr.*



New Products

New from Phase X

X Terminals

Phase X Systems, Inc. has announced a new generation of high-end, high-performance X terminals. The newly designed X terminals feature the latest LR33020 MIPS RISC processors from LSI Logic, a new X11R5 X server software, and Samsung's new line of high resolution monitors.

The 20-inch models include a choice of Trinitron display (Model PX20CE2T) or Invar Shadow Mask technology (Model PX20CE2I).

The CE models have a performance rating of over 100,000 Xstones, and the monochrome model PX19ME is rated at over 120,000 Xstones. The new X terminals provide a consistent architecture across the monochrome and color options.

The new X terminals include a minimum memory of 4 MB, expandable to 52 MB with 1 MB, 4 MB, or 16 MB SIMM increments.

Each X terminal supports up to 2 MB of PROM and up to 2 MB of FLASH memory ROM. The X server software can be preloaded prior to shipment to customers with the FLASH memory. In addition, the new models support up to 2 KB of NVRAM.

The new CE models feature one serial and one parallel port to handle serial or parallel devices. Network connectivity is accommodated by direct 10Base2 (BNC), 10Base5 (AUI 15-pin), 10BaseT,

thin wire, thick wire, and twisted-pair cable plug-in connectors.

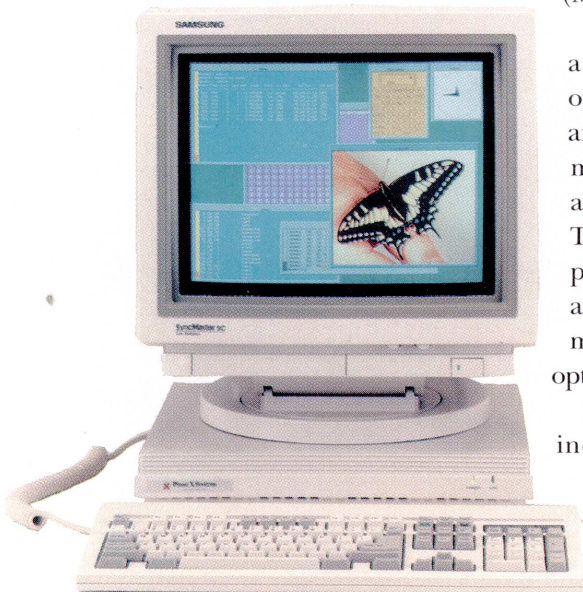
All X terminals support PC/AT, DEC, Sun, and PS/2 keyboards. A three-button mouse is included and an optical mouse is optional. The new X terminals are shipped with Xcellent, a new X11R5 X server software, at no additional charge. Xcellent supports HP-UX and other systems. The supported GUI standards include Motif, OpenLOOK, SCO Open desktop, and DECWindows.

The new features of Xcellent include low-memory warning system, a three-dimensional GUI boot user interface, and Domain and IEN-116 nameserver conventions. Other features include support for TCP/IP and DECnet protocols, Local Motif Window Manager, CSLIP, PPP, configuration lock, and remote configuration.

The PX17CE1, a 17-inch color 1,024x768 resolution X terminal, is priced at \$2,495. The PX17CE2, a 17-inch color 1,280x1,024 resolution X terminal, is priced at \$2,995. The PX19CE2, a 19-inch model with 1,280x1,024 resolution, is priced at \$3,395. A 20-inch color model featuring Invar Shadow Mask technology with 1,280x1,024 resolution is available at \$3,495. Phase X Systems is offering the Trinitron 20-inch color X terminal at \$3,995. The 17-inch color models offer 1,024x768 resolution with .28 and .26 dot pitch. All monitors have a refresh rate of 72 Hz.

The company announced that it will continue marketing the previous X terminal series, the PX19M, PX17CA1, and PX19CA2 models, at reduced prices. These X terminals are based on AMD29000 RISC processors.

The company offers lifetime support and "risk-free" purchase programs. Customers can receive free hotline support for as long as they own their X terminal.



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IEM International Sales
1629 Blue Spruce Drive
Fort Collins, CO 80524
Phone: (1) 303-221-3005
Fax: (1) 303-221-1909

Enterprise-Wide Architecture

Phase X Systems, Inc. also announced an enterprise-wide architecture for X Window systems. Called Total Enterprise X Architecture Strategy, it incorporates UNIX workstations, X terminals, X applications, and PC X integration software.

The announced architecture includes 14-inch to 20-inch color and monochrome X terminals; Xcellent X11R5 server with local Motif Window Manager; X for PC DOS, Windows, and NT; X for Macintosh; RISC workstation clones; office automation applications; and software integration and consulting services.

The Total Enterprise X Architecture will evolve to include additional best of breed products as they become available.

Contact Phase X Systems, Inc., 19545 NW Von Neumann Drive, Suite 210, Beaverton, Oregon 97006, ph: (800) 845-4064 or (503) 531-2400, fx: (503) 531-2401, e-mail: info@phasex.com.

Personal Edition of Project Management Tool

National Information Systems, Inc. (NIS), has announced the availability of the ACCENT GraphicVUE Project Management System, Personal Edition. ACCENT GraphicVUE, Personal Edition, incorporates advanced project management techniques within a mouse-driven, Motif Graphical User Interface.

ACCENT GraphicVUE is available on HP 9000 Series 700s running HP-UX Version 8.05 or greater and other workstations. ACCENT GraphicVUE, Personal Edition, is priced starting at \$995 with a 60-day money-back guarantee for each workstation license and can be upgraded to a multiple-project processing network version.

Contact NIS, 4040 Moorpark Avenue, San Jose, California 95117-1852, ph:

(800) 441-5758, (408) 985-7100, fx: (408) 246-3127, e-mail: info@nis.com.

Advanced Purchase Order Module

PILOT Systems, Inc., has announced the release of Advanced Purchase Order Module for the PILOT Manufacturing Software. It is designed for sophisticated material management in the area of purchase materials for both production purposes and customer orders.

Benefits include material management for tighter control of the purchase order cycle, the ability to store historical data for accurate pricing and delivery, increased communication between buyers and vendors, and reduction of clerical effort during purchase order processing.

PILOT Software runs on the HP 9000 and other UNIX systems.

Contact PILOT Systems Inc., 325 North Corporate Drive, Brookfield, Wisconsin 53045, ph: (414) 792-0050, fx: (414) 792-0620.

ERP/MRP II System

Madic-Compufact Corporation, a Devers Group Company, has announced Release 5.0 of its ERP/MRP II system, MAN-FACT II. This release includes both new features and enhancements to existing functions.

Sales analysis has been enhanced to include month-to-date, quarter-to-date, and year-to-date reporting on both units and dollars, with comparisons to prior years. Service level tracking has been added, as have Alternate Parts and Equivalent Parts features to the sales order entry function.

The purchasing function has been enhanced to include both request for quotes and blanket purchase orders. RFQs now track vendor responses and record pricing/purchasing actions.

Blanket purchase orders carry limits stated in either dollars or units, without requiring a specific part number. Enhancements to the accounts payable matching function allow matching of multiple invoices to one receipt or a single invoice to multiple receipts (additive matching).

The bar code function of MAN-FACT II has been expanded to allow the clocking in and out of shifts, jobs, or functions via the use of bar-coded input or employee badge readers. Physical inventory cycle counts may now be uploaded directly from portable bar code readers, and shop floor activity may also be input via a number of data collection devices.

Dynamic routings have been introduced to the production control system. Splits, send-aheads, and alternate steps/work centers automatically update the schedules for appropriate cells in manufacturing.

MAN-FACT II is designed as a full-function, UNIX-based, enterprise resources planning system. The basic functions of MRP II are complemented by modules (QA, Field Service, CAD Interface, etc.) that are often considered "peripheral" in traditional MRP systems. Both GUI- and character-based interfaces are supported. MAN-FACT II is available on the HP 9000 Series 700 and 800.

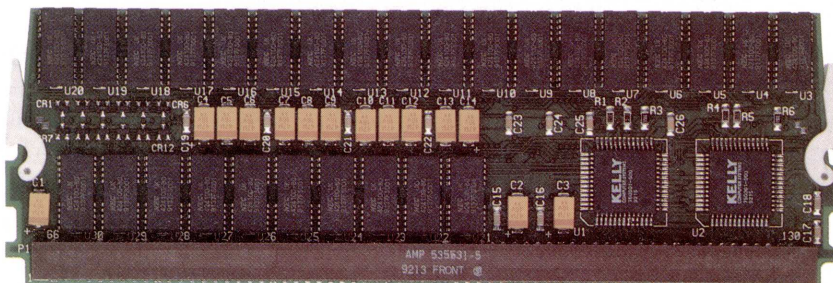
Contact Madic-Compufact Corporation, 7441 Lincoln Way, Suite 200, Garden Grove, California 92641, ph: (714) 891-6336, fx: (714) 897-7616.

Field Testing Software

Group 1 Software has announced CODE-1 Plus/UNIX for field testing, the first in a series of Group 1 products planned for UNIX. The new product will initially be usable with the IBM RISC 6000 and the HP 9000 computer platforms.

CODE-1 Plus is designed to allow

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three-part Exact Quality Replication (EQR™) program, to ensure transparent compatibility with your HP system.

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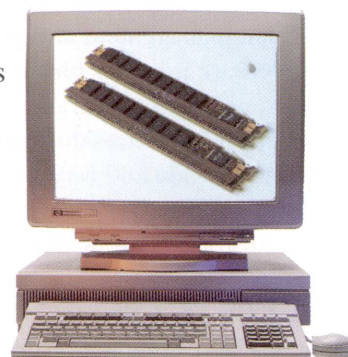
Second, we purchase only HP-approved components from HP-preferred vendors. For extra tolerance and reliability, we de-rate key components to run at less than their specified maximum, thus ensuring reserve capacity for maximum longevity.

Finally, we subject every finished product to a minimum of 100 hours' intelligent burn-in on the HP system for which it was designed.

The end result of our EQR system is a mean time between failures of over 60,000 hours. That's why we're able to back all our memory hardware with KELLY's Lifetime Hardware Warranty, Before

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KELLY also manufactures a complete line of memory and performance software for HP 3000 systems, including the new FormMaster/3000 turnkey electronic forms printing solution. For performance consulting, network integration or migration to HP-UX, please call our support department at (415) 960-0154.

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Group 1 Software offers a broad range of mail management and postal discount software products for the personal, midrange, and mainframe computers. Group 1 has offices throughout the U.S. and Canada and is represented by distribution partners in the United Kingdom, Australia, New Zealand, and Scandinavia.

Contact Group 1 Software, 4200 Parliament Place, Suite 600, Lanham, Maryland 20706-1844, ph: (800) 368-5806, ext. 341 or (301) 731-2300, fx: (301) 731-0360.

Product Information Management

Workgroup Technology Corporation has announced the availability of its CMS and CMS/Workflow Product Information Management (PIM) software for Hewlett-Packard 9000 Series 700 Systems. The CMS products support the Motif interface running on HP-UX.

Workgroup Technology's CMS product is a comprehensive PIM system for managing all the information (CAD files, technical manuals, images, product structures, etc.) required to bring a product or service to market. With CMS, information may be organized, controlled, viewed, and distributed, ensuring that the appropriate versions of files and configurations are

always available for the task at hand.

CMS for HP-UX will be followed by CMS/Pro for HP-UX, Workgroup Technology's configuration and release management product for Pro/ENGINEER users. CMS/Pro manages Pro/ENGINEER file configurations and associates them with related documentation from any source application, using an industry-standard SQL database.

A 10-user concurrent license for CMS with run-time Oracle costs \$2,195 per seat. Contact Workgroup Technology Corporation, 81 Hartwell Avenue, Lexington, Massachusetts 02173, ph: (617) 674-2000, fx: (617) 674-0034.

Statistical Operations Libraries

Quantitative Technology Corporation published its first Math Advantage library over 10 years ago with 334 routines. QTC now announces its new Numerical Advantage software, which contains 1,860 routines. Numerical Advantage consists of three high-performance subroutine libraries available in either C or FORTRAN—Math Advantage, STAT Advantage, and SPEC Advantage. QTC's flagship Math Advantage library has been upgraded to Version 5.0, containing 996 routines. The new STAT advantage library contains 422 routines to perform extensive analytic and descriptive statistical operations. The new SPEC advantage library contains 442 routines to compute special functions, polynomials, and integrals.

Numerical Advantage libraries are currently available on over 100 major platforms, ranging from supercomputers to PCs and including HP 9000 workstations.

Contact Mike DeSario, Quantitative Technology Corporation, 9360 SW Gemini Drive, Beaverton, Oregon 97005-7109, ph: (503) 626-3081, fx: (503) 641-6012.

New from Artecon

Multifunction Jukeboxes

Artecon has introduced an expanded lineup of multifunction jukeboxes ranging from 10 GB to over 200 GB for both SPARC and HP 9000 networks with archiving and nearline storage needs.

The 1.3 GB drive adheres to the latest ISO standards while sustaining average access speeds of 23.5 msec for extremely fast transfer rates, the company notes. Pricing starts at \$13,995 for the 10-slot 10 GB jukebox.

Distributed Hierarchical Storage Management

Artecon has also introduced FileTrek, a client-server network-based distributed Hierarchical Storage Management System (HSM) for Sun SPARC and HP 9000 platforms.

FileTrek is designed to provide a complete suite of HSM capabilities including user-transparent file migration, automatic restoration, archiving, and system backup.

FileTrek is designed to automatically and transparently move targeted files to less expensive storage based on user-defined criteria. This reduces the need for more costly hard drive storage devices, since the local hard disks are left available for storage of needed data. According to the company, restoration of migrated files from an optical jukebox or 8 mm stacker is also transparent.

FileTrek adheres to accepted industry standards such as IEEE Mass Storage Reference Model, ISO 13346 NSR (non-sequential recording format), OSF Distributed Computing Environment, MIT X11, and OSF/Motif.

FileTrek supports SPARC servers running Solaris 1.X and 2.2, HP 9000 Model 700 workstations and Model 800 servers

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running HP-UX 8.07 and 9.0X. FileTrek also supports Artecon's complete line of optical jukeboxes and 8 mm stackers.

Pricing starts at \$7,100 and includes a server license for up to 16 cartridges, and client license for unlimited workstations (same platform) in the network.

Contact Artecon, 2460 Impala Drive, Carlsbad, California 92008-7236, ph: (619) 931-5500, fx: (619) 931-5527.

New from Advanced Archival Products

Hierarchical Storage Management Software

Advanced Archival Products, Inc. (AAP) has introduced AMASS-Migrator hierarchical storage management software, designed to offer a flexible environment by providing both transparent file migration and the ability to directly access optical disk and/or tape libraries. During file migration, the product is designed to automatically make space available when a magnetic disk's file system begins to fill or when user-defined migration criteria are met.

It is also designed to assess the status of files and, based on the system administrator's criteria, transparently move the identified files to less costly storage such as optical jukeboxes or tape libraries. To the application, migrated files still appear to be present and are transparently retrieved when accessed, the company notes.

AMASS-Migrator may be configured for server or client-server operation and runs as a layered product on AAP's AMASS file system. AMASS is reported to be the only direct access jukebox file system to provide a single device, single unlimited file system view of jukeboxes of all sizes and media types. Combined with integrated functions

such as magnetic disk caching and online index of jukebox directories and files, AMASS provides a high-performance, coherent method for directly accessing removable media storage devices.

AMASS-Migrator is currently available for SUN. Support for HP 9000 and IBM RS/6000 will be available in December 1993. AMASS-Migrator supports 16 different manufacturers of optical and tape libraries, from gigabytes up to hundreds of terabytes. It is also available as an upgrade to existing AMASS customers.

Contact Christopher Kokias, Advanced Archival Products, Inc., 6595 S. Dayton Street, Suite 1200, Greenwood Village, Colorado 80111, ph: (303) 792-9700, fx: (303) 792-2465.

Optical Jukebox

Advanced Archival Products, Inc. (AAP) and Cygnet Systems, Inc. have announced the availability of AMASS optical disk jukebox file system for the Cygnet Series 1800 expandable, 12-inch optical jukebox family. This product combination is designed to provide high-capacity optical jukebox UNIX solutions for HP workstations and others.

AMASS reportedly is the only direct access jukebox file system to provide a single device and single file system view of all models of the Cygnet Series 1800. Combined with integrated functions such as magnetic disk caching and high-speed online index, AMASS is designed to provide high performance and a coherent method for users to directly access storage devices ranging from a few gigabytes to several terabytes.

Contact Christopher Kokias, Director of Sales and Marketing, AAP, 6595 S. Dayton Street, Suite 1200, Greenwood Village, Colorado 80111, ph: (303) 792-9700, fx: (303) 792-2465.

UNIX-to-IBM Connectivity

CLEO Communications, a division of Interface Systems, Inc., has announced that Micro Systems Support Corporation (MSSC)—a fast-growing systems integration firm headquartered in Deer Park, New York (Long Island)—now distributes CLEO's UNIX-to-IBM connectivity products.

MSSC integrates wide-area networking, connectivity, desktop publishing, and multimedia solutions for major banks, brokerage firms, insurance companies, law firms, and manufacturers in downstate New York, Connecticut, and New Jersey.

CLEO's LINKix products for UNIX-to-SNA connectivity include 3270LINKix, which enables UNIX-based systems to operate as IBM 3x74 controllers and 3278/79 display terminals in SNA (Systems Network Architecture) networks. CLEO offers 3270LINKix for remote SNA/SDL, coax DFT, and QLLC/X.25 configurations. Also available from the company are LINKix packages for 3770 SNA, RJE, APPC/LU6.2, LUA/LU0, and SNA rlogin, as well as a NetView DM client for host-initiated, host-managed file transfer between remote UNIX systems and SNA hosts.

CLEO's LINKix products work with 386/486-based computers running SCO UNIX, UNIX SVR4, and Interactive UNIX. Most packages also support IBM RS/6000 AIX systems.

CLEO's 3780Plus is a 3780/2780 binary synchronous communications solution that provides full IBM 3780/2780 remote job entry emulation for systems running HP-UX and other UNIX-based operating systems. It also works with DOS and VAX VMS.

Contact CLEO Communications,

3796 Plaza Drive, Ann Arbor, Michigan 48108, ph: (313) 662-2002 or (800) 233-2536, fx: (313) 662-1965.

1988 X.400 MIT

Enterprise Solutions Limited has announced the availability of the Enterprise Solutions Limited X.400 Message Transfer Agent (ES/MTA), a fully compliant native X.400-based MTA conforming to 1988 X.400 standards. ES/MTA is suitable for high-volume message switching and can accommodate the variety of message types and the range of protocols typically found in larger corporate environments.

This addition to the ENTERPRISE MAIL X.400/X.500 product family is designed to enable users to establish and support a mixed environment. ES/MTA resides on a server and provides message transfer services between multiple servers and to compatible user agents. Because it includes multi-protocol support, users gain the benefits of both gateways and conversion. ES/MTA also includes full format conversion support between protocols.

The ES/MTA provides a 1988-compliant Message Store with full P7 protocol support and also provides for automatic downgrading when inter-operating with other 1984 MTAs. The product is designed to fully support the XAPIA APIs as published by X/Open. Simple, proprietary high-level protocols based on the CMC API with extensions are also supported, allowing developers to either build applications or interface the X.400 to existing applications.

The ES/MTA is designed to provide reliable message transfer services via automatic routing and tracking. It is used for communications between PCs, workstations, and larger computers over internal

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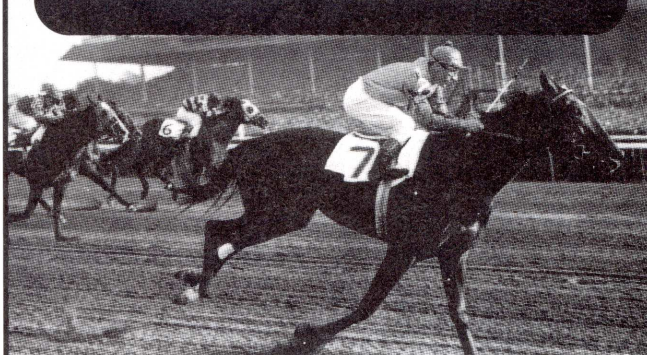
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networks, as well as for external public network services including X.400 and X.25 services. The ES/MTA can also be used over LAN connections and dial-up using remote user agents.

Management functions include dynamic control of MTA operation through both monitor mode and privileged control mode. The network administrator, whether local or remote, has access to key data, traffic information, and event reporting. The product displays volume and message counts and features graphic illustrations of submission and delivery rates that are designed to be easy to understand. Information can be routed to a network management console or to a remotely operated line console.

The ES/MTA is available now at a list price starting at \$1,295. Contact Enterprise Solutions Limited, 32603 Bowman Knoll Drive, Westlake Village, California 91361, ph: (818) 597-8943, fx: (818) 597-9621.

Disk Storage Subsystem

Falcon Systems has announced a new disk storage subsystem for Hewlett-Packard-based computer systems. The subsystem is designed to integrate from one to eight high-capacity disk drives and a power supply into an attractive, user-friendly enclosure. Data transfer is made over the SCSI-2 Fast and Wide bus, providing burst data transfer rates at up to 20 MB/sec.

Configurations of the subsystem include one, two, four, or eight drives. This allows customers to purchase disk capacity to precisely match their needs. With eight drives, the subsystem has a maximum capacity of 27.2 GB (unformatted).

For exact configuration availability, contact Falcon Systems, Inc., 1417 W. North Market Blvd., Sacramento, CA 95834, ph: (916) 928-9255, fx: (916) 928-9355.

SPEEDWARE Supports ORACLE

Speedware Corporation has announced SPEEDWARE Version 7.01, which features full support of ORACLE, the introduction of a multi-user environment, support for Novell NetWare, extended OMNIDEX support, embedded structured query language (SQL), and views for support of relational database management systems (RDBMS). SPEEDWARE Version 7.01 is available on HP 3000 and 9000 systems.

SPEEDWARE's multi-user Designer feature is designed to allow several users to concurrently access SPEEDWARE's real-time, object-oriented application repository. A sophisticated control strategy ensures development consistency and synchronization.

Support for Novell NetWare is also available with the new release, enabling users with SPEEDWARE Versions 6 or 7 to migrate existing applications to a LAN environment. SPEEDWARE supports PC-based LANs on DOS, OS/2, and UNIX.

SPEEDWARE Version 7.01 also offers OMNIDEX support, which is designed to provide high-speed retrieval and additional data retrieval capabilities.

The addition of embedded SQL and views enhances the support of RDBMS by supporting native features. The introduction of views provides a logical view of the data. Developers are able to define views within the database, within the data directory, or dynamically within an application.

Systems developed in SPEEDWARE are completely portable across multiple platforms including MPE/iX, MS-DOS, and MS Windows. Version 7.01 offers full support of SYBASE, ALLBASE, and ORACLE.

Average user-based pricing for a single-user development environment starts at approximately \$5,000. Unlimited CPU-

based pricing for development and application environments can exceed \$150,000.

Contact Speedware Corporation, 150 John Street, 10th Floor, Toronto, Ontario M5V 3E3, Canada, ph: (416) 408/2880, fx: (416) 408/2872.

High-Capacity Floptical

Conner Storage Systems Group, formerly Maynard Electronics and currently a unit of Conner Peripherals, Inc., has introduced the Conner Floptical storage system (Model SF21e), a 21-MB external floptical drive. The Conner Floptical storage system, reportedly the first high-capacity floptical drive for the HP 9000 Series 700s is now shipping with end user prices beginning at \$900.

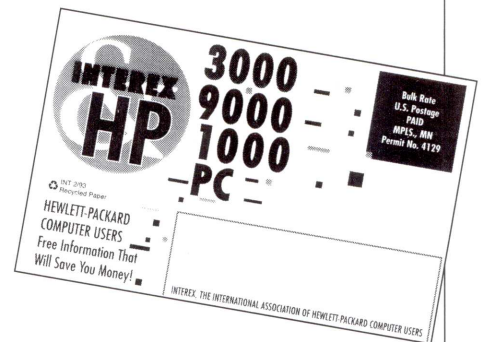
As part of an agreement with HP and 3M, HP has developed the driver software required for compatibility with the HP Apollo Series 700 workstation. 3M has manufactured and developed the 3.5-inch 21-MB floptical diskette and is actively involved in launching the Conner Floptical storage system.

Each removable floptical diskette stores up to 21 MB of data, offering approximately 14 times the data capacity of a conventional 3.5-inch floppy diskette. The Conner Floptical storage system also transfers data approximately two to three times faster than low-capacity floppy drives, the company notes. The drive can read and write the standard 2 MB floppy format used by HP workstations.

Conner has established a dedicated UNIX business unit with UNIX-trained customer support specialists, a toll-free technical support hotline, 24-hour electronic bulletin board service, spare-in-the-air emergency replacement, and 24-hour person-to-person technical support. All Conner storage subsystem

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For more information, contact Liway Gimenez, Interex, P.O. Box 3439, Sunnyvale, California
94088-3439 USA, Phone (408) 747-0227, FAX (408) 747-0947.

products include a one-year warranty and a 48-hour repair policy for all in-warranty customer equipment within the continental United States.

Contact Conner Storage Systems Group, ph: (800) 821-8782 or (407) 263-3500.

Video Mixer

RGB Spectrum has announced SynchroMaster 300, designed to combine the output from two high resolution imagers or computers (up to 1,280x1,024 pixels) to produce a composite high-resolution picture.

The SynchroMaster 300 is designed for real-time image fusion applications in simulation, where it allows the production of images of greater complexity than a single computer or scene generator can produce in real time, and in medical imaging, for comparative analysis of real and synthetic images.

Typically, one image is used as the foreground and the other as the background. The background signal is digitized and written to a 1,280x1,024 frame buffer and then synchronized to and combined with the foreground signal.

Images are combined by using a chroma key, a luminance key, or a weighted sum algorithm. The SynchroMaster incorporates a frame store synchronizer to allow the mixing of asynchronous images from disparate sources.

SynchroMaster is HP 9000-compatible and is priced at \$12,995. Contact RGB Spectrum, 950 Marina Village Parkway, Alameda, California 94501, ph: (510) 814-7000, fx: (510) 814-7026.

Data Acquisition Software

Computer Assisted Data ACQuisition (CADACQ) software Version 1.0 from Summit Instruments, Inc. is now available for Rocky Mountain Basic HP 9000

Series 200, 300, and 400 workstations.

CADACQ provides continuous data acquisition for high-speed dynamic test and transient measurement applications. Acquisition throughput of 20,000 readings per second with display page refresh rates of 5 to 15 Hz for 12 to 16 dynamic graphic displays per page is said to be easily achieved using an HP 345.

During acquisition, user-configurable, multi-page displays provide real-time strip charts, VU meters, bar charts, XY graphs, and digital meters. Data calculations, time-qualified limit checking, and storage to disk are also supported in real time. Data playback provides post-processing analysis and display with variable rate, forward, reverse, and pause control.

All interfaces, including GPIB, GPIO, VXI, and RS-232, are supported. Data transfers can use either ASCII or binary, with either block DMA or time-scheduled I/O. CADACQ's instrumentation interface can also be customized, allowing throughput to be optimized for specific instrument intelligence and architecture.

CADACQ starts at \$2,950. Contact Summit Instruments, Inc., 853 N. Medina Line Road, Akron, Ohio 44333-1323, ph: (216) 668-2878 or (216) 498-1090.

Load Balancer

Freedman Sharp and Associates Inc. has released Load Balancer Version 3.4, which features performance and policy-implementation features and a front-end package for Microsoft Windows.

The new version has multiple queues, a fully transparent interactive mode; better centralized job logging; application grouping, availability schedules for users, groups, and applications; and a variety of other control facilities.

The front-end package for Microsoft Windows, available for the first time with

Version 3.4, is designed to give users the ability to submit and manipulate UNIX jobs using a point-and-click interface from PC desktop platforms.

Load Balancer uses dynamically gathered performance information and centralized configuration information about each application, computer, and user to run each job on the fastest eligible computer. In addition to performance optimization, Load Balancer handles policy constraints such as licensing, security, multi-platform speed/memory/swap differences, user priorities, time-of-day constraints, and per-user permissions for each machine and application.

The central configuration file is designed to allow system administrators to retain complete control over who can run what, where, and when. The software, designed to be transparent to users and to require no application or kernel modifications, can be reconfigured on-the-fly at any time without rebooting or restarting any daemons. Users may run, view, kill, and manipulate their jobs from any computer on the network. Interactive character and X-window applications are fully supported, as are batch-oriented jobs.

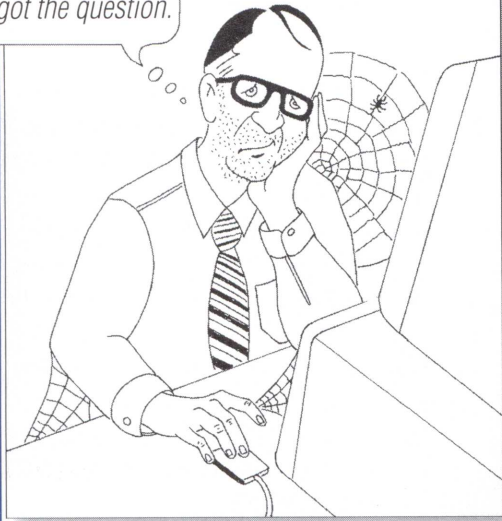
Load Balancer also includes a network-wide batch queuing system, which is used to queue jobs when no suitable computer is available or when execution should be deferred until a later time. The queuing system has 256 priority levels and allows different default and maximum priorities to be assigned to each user and application.

The Freedman Sharp Load Balancer is available for HP and other platforms.

Contact Freedman Sharp and Associates, Inc., 508-1011 - 1st Street, S.W., Calgary, Alberta, Canada T2R 1J2, ph: (403) 264-4822, fx: (403) 264-0873, e-mail: dan@fsa.ca.

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New HP Premier Solution Partner

Metrix Customer Support Systems, Inc. was recently named by Hewlett-Packard as its Premier Solution Partner for Service Management. This is the fifth year that Metrix has been included on Hewlett-Packard's select list of solution partners.

Metrix, which has been in business since 1980, is a 1990 and 1991 member of the Inc. 500 list. OpenUPTIME's field service, support desk, and repair center modules run in an open systems environment. OpenUPTIME is available for Hewlett-Packard systems and others, as well as LAN environments running the following relational databases: Sybase, Oracle, Ingres, Informix, ALLBASE, and Rdb.

Contact Metrix Customer Support Systems, Inc., 20975 Swenson Drive, Waukesha, Wisconsin 53186-4064, ph: (414) 798-8560, fx: (414) 798-8573.

Software for X Terminals

Pagine Corporation has introduced CD2000X software, designed to address low X terminal memory, difficult installation processes, and the complexity of font support. Packaged in a CD-ROM, the software also supports a light pen interface option and additional local clients.

Pagine has incorporated a hardware memory management unit (MMU) and software tightly optimized for efficient MMU usage. The workstation-like software architecture includes a faster system-call interface to free memory back to the system. An allocation system is designed to minimize memory fragmentation based on a virtual address translation scheme.

Pagine developed a friendly setup interface. While most X terminals boot via TFTP, Pagine terminals can also boot via NFS. The NFS mounting process is

faster and more reliable than TFTP, the company notes.

Based on X11R5, Pagine's server supports R5 fonts and can read X11R4 SNF fonts. Font support is further refined with the ability to access fonts from multiple and diverse machines directly from the terminal's font path. The product also supports compressed fonts.

A light pen option has been implemented, with a physical connection via the serial mouse port. The software includes calibration routines and simulates a single-button mouse, making the product ideal for applications where space is limited.

The new software will further enhance the performance of Pagine's C2000/M2000 platform. Based on a 33-MHz, MIPS R3000-compatible processor with cache and MMU, the company developed a 64-bit color graphics engine

designed to bypass the CPU to process graphics operations at fast speeds.

The CD2000X software and C2000/M2000 terminals are compatible with all HP 9000s. Contact Pagine Corporation, 1961-A Concourse Drive, San Jose, California 95131, ph: (408) 944-9200, fx: (408) 944-9728.

New from Portable Graphics

Graphics Library for X Terminals

Portable Graphics, Inc. has announced a version of its hardware-independent NPGL library that permits Silicon Graphics applications to be accessed through X terminals. Using Xlib, software developed with the IRIS GL 4.0 library from Silicon Graphics can be used remotely across a network on any color X11 server without special graphics acceleration hardware. NPGL-X is available now.

NPGL renders through standard Xlib calls. All primitive rendering and GL window management is handled through X11 on the server side, while the client side maintains the GL state and executes the geometry pipeline. Double-buffered operations are supported if the X server supports Xlib multi-buffering extensions.

Simple three-dimensional applications meant for widespread use can be developed through IRIS GL's simplified windowing system and powerful GL-widgets. In addition, NPGL-X performance is well-suited for three-dimensional applications that use flat-shaded polygons, and two- or three-dimensional wireframe operations, the company notes. These applications include instrumentation panel simulators, seismic charting, financial model simulators, and electronic computer-aided design.

Graphics Products for Application Developers

Visual Numerics, Inc., a developer of application development tools and visual data analysis software, has announced the release of two new graphical ADT products, Exponent Graphics for X and Exponent Graphics for C, Version 2.0. These graphical libraries are said to reduce by up to 95 percent the time and code required to generate complex data plots.

Exponent Graphics for X is for programmers whose expertise is in coding graphics applications specifically designed

for operation in the X-windows environment. The library is built on the Xt Toolkit, giving users a library of Motif-based graphing widgets that conform to the syntax and standards expected by X programmers.

Exponent Graphics for X includes more than 30 high-level two- and three-dimensional plot types commonly used in scientific and business applications. In addition, the product will be bundled with UIM/X, a graphical user interface (GUI) development tool from Montreal-based Visual Edge Software Ltd. UIM/X is designed to provide access to all of the capabilities of Motif and to reduce application development time. The library also provides a built-in interactive GUI that lets developers customize their graphing plots.

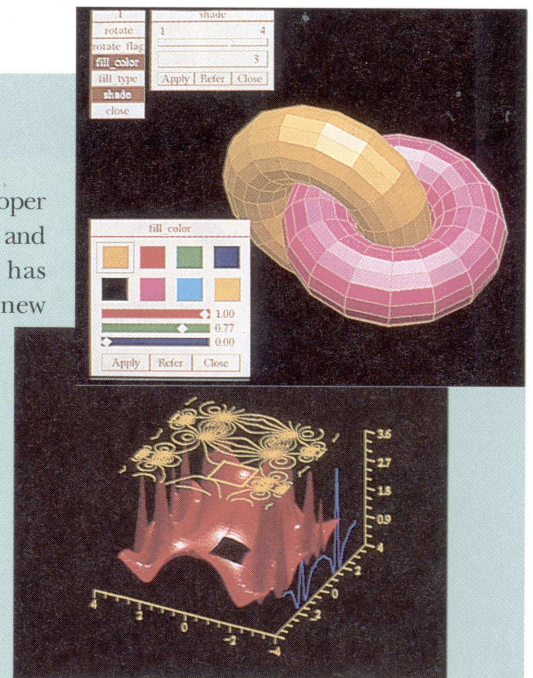
Exponent Graphics for C Version 2.0 features two major enhancements over the first version: complete user control of the X event loop and a built-in Motif-based GUI for plot customization. The product's interactivity enables users to make changes to all plots generated by Exponent Graphics for C.

Exponent Graphics for C's built-in plot-customization GUI provides menus that give users a variety of plot attributes from which to choose. For C programmers not building Motif-based applications, the graphics library provides these menus through a proprietary system, not a Motif developer's kit. For Motif-based applications, the software gives developers the option of using a plot-customization GUI based entirely on Motif.

Exponent Graphics for C is written entirely in C and its programming interface conforms to C standards. The product offers more than 20 two- and three-dimensional application plots, about 300 customizable graph attributes (fonts, colors, line types, shading, etc.), and support for a variety of high-performance output drivers.

Exponent Graphics for X costs \$3,995 for a single-user license. Exponent Graphics for C Version 2.0 costs \$3,495 for a single-user license. Both products support HP workstations and others.

Contact Visual Numerics, Inc., 6230 Lookout Road, Boulder, Colorado 80301, ph: (303) 530-9000, fx: (303) 530-9329.



Exponent Graphics

NPGL-X complements NPGL, which takes full advantage of three-dimensional hardware acceleration on HP and other workstations. A client-server version of NPGL-X will also be released for SGI workstations.

NPGL-X is priced at \$1,900 for each host, with unlimited X server access. A Development License for NPGL-X will be included with standard NPGL Development Licenses (\$3,600) for Sun, HP, DEC, Kubota, and IBM.

IRIS Explorer on HP

The Numerical Algorithms Group (NAG) is using the NPGL library from Portable Graphics to make IRIS Explorer available on HP workstations and others. IRIS Explorer is a visual programming system for developing three-dimensional scientific data visualization, manipulation, and analysis applications. Until now, IRIS Explorer has been available only on Silicon Graphics computers. According to Portable, the NPGL software is allowing NAG to port the application to each new workstation very quickly, while maintaining each platform's full three-dimensional capability.

Software developers can move or distribute their IRIS Explorer-based applications throughout the most popular ranges of workstations by linking to Portable Graphics' NPGL library. NPGL, a hardware-independent version of the IRIS GL 4.0 library, is designed to allow SGI applications to fully exploit the speed and graphics capability of non-SGI workstations.

Introductory prices start at \$2,000. The first port, for Sun workstations, will ship from The Numerical Algorithms Group soon. Other ports will follow shortly.

Contact Portable Graphics, Inc. (address listed below) or Karen

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Stalewska, The Numerical Algorithms Group Limited, Wilkinson House, Jordan Hill Road, Oxford, United Kingdom OX2 8DR, ph: 44 865 511245.

IRIS Inventor on HP

Portable Graphics also announced that it is licensing IRIS Inventor from Silicon Graphics, Inc. for distribution on non-SGI platforms. Portable Inventor is designed to allow Inventor-based three-dimensional applications to run in virtually any workstation environment without changing the source code. Because it uses Portable Graphics' NPGL library, applications developed with Inventor will run at the full speed and graphics capability provided by non-SGI platforms, the company notes. The company will release Portable Inventor for HP and other workstations in the fourth quarter of 1993.

Developed by Silicon Graphics, Inventor is an object-oriented toolkit for developing three-dimensional visualization and animation programs.

Contact Portable Graphics, One Technology Center, 2201 Donley Drive, Suite 365, Austin, Texas 78758-4538, ph: (512) 908-4700.

Dickens and Computer Associates Agreement

Dickens Data Systems, Inc. has announced that it will sell and support CA-UNICENTER for UNIX. CA-UNICENTER provides enhanced security and manageability for distributed open systems environments running mission-critical business applications on UNIX.

Dickens Data Systems, Inc. is a full-service Systems Integrator providing project management, custom programming, and training.

Contact Dickens Data Systems, Inc., 1175 Northmeadow Parkway, Suite 150,

Roswell, Georgia 30076, ph: (404) 475-8860, fx: (404) 442-7525.

Configuration Management System Enhanced

CaseWare, Inc. has announced options that enhance CaseWare/CM Configuration Management System. The integration options are for CenterLine's CodeCenter/ObjectCenter, HP's SoftBench, and IDE's Software through Pictures (StP) CASE product.

The CaseWare integration with CenterLine products for C and C++ development environments now support Release 4.0 of CodeCenter and Release 2.0 of ObjectCenter. This integration is designed to provide access to basic versioning operations (check-in and check-out) from within CodeCenter/ObjectCenter, as well as automatic generation of Makefiles that contain full CodeCenter/ObjectCenter load instructions. The integration uses the new CenterLine API (CLAPI), combined with the facilities of the new Project Browser. The new integration is designed to add control integration to the already provided data integration. Furthermore, since CenterLine now offers an OSF/Motif user interface, the integration also delivers significantly improved presentation integration.

The existing integration of CaseWare/CM with HP's SoftBench and SoftBench Encapsulate has been enhanced to support Release 3.0 of SoftBench on both HP and Sun Microsystems workstations. This integration is intended to improve productivity by providing a graphical user interface. The ability to use the event-driven trigger capability of SoftBench provides an easily customizable and powerful form of process automation.

The CaseWare/CM Software through

Pictures integration is designed to provide users with direct and easy access to StP diagrams, DPS document templates, generated FrameMaker MIF documents, and the StP Project Database. Users can access StP diagrams both through the CaseWare/CM Graphical User Interface as well as through the traditional StP Main Menu. According to the company, using the CaseWare/CM Graphical User Interface provides a view of the component diagrams within an StP system along with StP's control integration mechanisms for communicating with the graphical editors.

CaseWare/CM is currently available on HP 9000 Series 300, 400, 700, and 800 under HP-UX 8.x and 9.x. Contact CaseWare, Inc., 108 Pacifica, Second Floor, Irvine, California 92718-3332, ph: (714) 453-2200, fx: (714) 453-2276.

SNMP Power Management

Network Security Systems Inc. (NSSI) has announced a new software package in support of Novell's NetWare Management System (NMS). NSSI's LanSafe II for NMS is an SNMP-compatible, snap-in power management application designed to interactively manage and control NSSI uninterruptible power supplies (UPSs) attached to file servers throughout the enterprise network.

LanSafe II for NMS is automatically initiated when NMS is loaded, the company notes. Through an "autodiscovery process," NSSI's UPSs are added to the NetWare Management Map. By clicking the UPS Map icon, users can "smart" launch the LanSafe II for NMS console to graphically display the UPS's configuration and the power parameters/conditions of the protected server. The LanSafe II for NMS console is designed to allow system administrators

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to interactively monitor and manage NSSI UPSs on the network without having to reboot the system for configuration changes to take effect.

Additional features of LanSafe II for NMS include monitoring and logging of power conditions, customized hardware voltage settings based on actual power conditions, automated system-wide power testing, remote shutdown and reboot, and unattended NetWare orderly shutdowns.

List price for LanSafe II for NMS is \$199. Contact NSSI, 9401 Waples Street, San Diego, California 92121, ph: (800) 755-7078 or (619) 587-7950, fx: (619) 552-9162.

Document Revision, Comparison, and Archiving Software

DataBase Publishing Software, Inc. (DPS) has announced the next generation of SmartLeaf/Compare, its document revision, comparison, and archiving software, for use with Interleaf electronic publishing software. This latest release provides greater flexibility in controlling document comparisons and offers more robust revision management tools.

SmartLeaf/Compare highlights the differences between document versions by generating marked-up copy. Compare is designed to highlight differences between the two compared revisions and to give the user a list of changed pages so that an entire document does not have to be searched to find where the changes have occurred.

A new interface is designed to accommodate users' specific requirements with click-buttons on a configuration sheet. The configuration sheets respond to user input so that only the choices relevant to that user are displayed.

Compare 3.0 also includes an

Trackball for HP 9000/700s

ITAC Systems, Inc. has announced that its MOUSE-TRAK trackball computer input device is available immediately with an HP-UX serial device driver for use with HP Apollo 9000 Series 700 PA-RISC workstations. According to the company, the significance of this announcement is that the serial device driver eliminates the need for a costly and hard-to-find Quadrature Port adapter. MOUSE-TRAK is an input device designed to combine the ease-of-use of a mouse with the precision and productivity of a trackball.

The HP-compatible MOUSE-TRAK package includes the input device and a disk containing the HP-UX driver. The HP version is available directly from ITAC Systems and through resellers internationally and has a suggested list price of \$199 for the Professional HP unit, Model BHPSEB, and \$295 for the industrial HP unit, Model BHPSID. The HP driver is available as an option on DAT for \$50.

MOUSE-TRAK uses less functional space than a traditional mouse and requires no special pad or surface.

The Industrial unit is constructed of glass-filled Xenoy thermo plastic alloy that has been tested and approved for U.S. military use. A Mylar ring provides additional protection from dust and debris, and the printed circuit board has a conformal coating for water resistance in high-moisture areas.

Contact ITAC Systems, Inc., 3113 Benton Street, Garland, Texas, 75042, ph: (214) 494-3073, fx: (214) 494-4159.



MOUSE-TRAK Trackball

enhanced comparison engine, with improved evaluation of the differences between types of document revisions. More sensitive to similarities between paragraphs, Compare 3.0 can better discern between changes to an existing paragraph and the insertion or deletion of paragraphs. Compare 3.0 also offers several new choices in defining the rules for comparing documents.

Compare's archiving feature is designed to manage all document revisions for documents that are updated and revised over time and that need to be tracked and maintained.

SmartLeaf/Compare is licensed on a server basis (serves one to four users) at a list price of \$4,995. (Current Compare customers will receive the new

release as part of their software maintenance agreements.)

SmartLeaf products are available on HP/Apollo 9000 Series 700s and other workstations. SmartLeaf products support the following SQL databases: Oracle, Informix, Ingres, Sybase, and Rdb/VMS.

Contact DataBase Publishing Software, Inc., 400 West Cummings Park, Suite 5300, Woburn, Massachusetts 01801, ph: (617) 938-0018, fx: (617) 938-3810.

CDDI/FDDI For HP Workstations

Crescendo Communications and Hewlett-Packard have announced 32-bit Enhanced Industry Standard Architecture (EISA) adapters supporting the HP Apollo 9000 Series 700 workstations using Fiber Distributed Data Interface (FDDI) over

unshielded twisted pair (UTP), shielded twisted pair (STP), and fiber-optic cable.

The adapters are designed to provide 100-mbps connections for an HP workstation to any FDDI or CDDI concentrator, such as the Crescendo Stackable Workgroup hub. Products include the C320-HP CDDI EISA Adapter, C321M-HP FDDI EISA Adapter, C325 CDDI EISA Dual-attach Option, and C316M FDDI EISA Dual-attach Option. Single-attach adapters require a single slot. The dual-attach option requires a second slot.

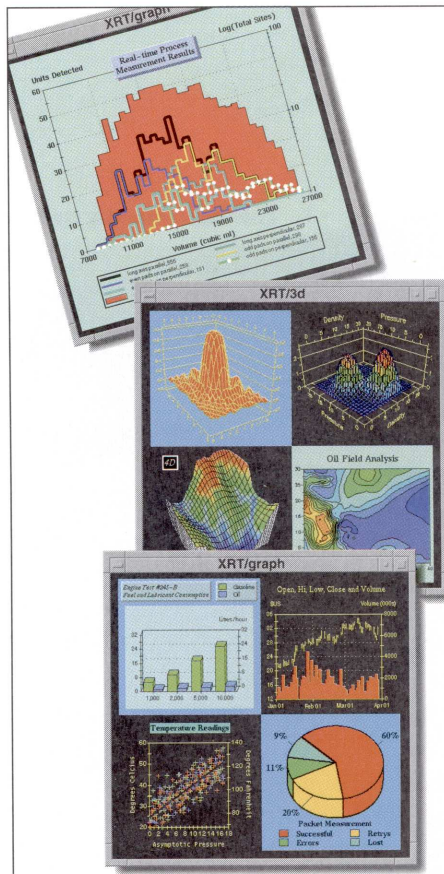
All products support the Simple Network Management Protocol (SNMP) agent and are compatible with SNMP-based network management platforms, such as HP's Openview. The SNMP network management application, the C1802 Crescendo Manager for the HP/Apollo workstation, is designed to provide remote management of any Crescendo concentrator on the network, using a graphical representation of the concentrator front panel.

The C320-HP CDDI EISA Adapter has a list price of \$1,495. The C321M-HP FDDI EISA Adapter has a list price of \$1,995. The C325 CDDI DAS and C326M FDDI DAS options are available for \$695 and \$1,395. The C1802 Crescendo Manager for HP is available for \$895. All products are available today.

Contact Crescendo Communications, 710 Lakeway, Suite 200, Sunnyvale, California 94086, ph: (800) 238-CDDI (2334).

Network-wide Backup

Innovus Inc. has announced that the NetWorker software from Legato Systems, Inc. will now be available for HP 9000 PA-RISC servers. NetWorker for HP 9000 provides network-wide back-up and recovery services to multi-vendor networks.



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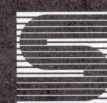
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Low-cost memory boards

Memory Upgrades

Martech has announced the availability of its low-cost memory boards for new HP workstations. Martech is currently shipping from stock in upgrade sets of up to 64 MB for HP 9000 Models 715, 725, 735, and 755 running HP-UX. In addition, memory boards for nearly all HP 1000, 3000, and 9000 systems are available at reduced prices.

Martech is also shipping memory for new HP corporate business computers in upgrade sets up to 64 MB. These upgrades are less than half the price of HP's upgrades, Martech notes. HP 9000 Series 800 Models F, G, H, and I and HP 3000 Models 977 and 987 are supported. Martech also maintains a vast inventory of memory products for older systems, including HP 9000 Series 8x7 and HP 3000 Series 9x7. As one of the oldest suppliers of HP-compatible memory products, Martech boasts the industry's broadest inventory of 100 percent HP/Apollo-compatible memory, according to the company. All Martech boards are built from the same quality components used by HP, the company notes.

Martech offers a "Satisfied for Life" buyer protection plan with all of its memory products, which includes a lifetime product warranty, free overnight board replacement, no-cost telephone support, and a 90-day, 100-percent money-back guarantee.

Contact Martech, 1151 W. Valley Blvd., Alhambra, California 91803, ph: (800) 582-3555 or (818) 281-3555.



Legato NetWorker reportedly is the only enterprise-wide software application that protects files on popular network server and desktop systems, allowing easy recovery when a needed file is destroyed or damaged. NetWorker is designed to provide a common tape format, central management, and interoperability between multiple UNIX platforms and NetWare.

NetWorker software has been ported by Innovus to HP 9000 Series 700 and 800 servers. NetWorker for HP 9000 includes support for a wide range of UNIX clients. Novell NetWare servers can also be backed up as NetWorker clients. A full range of backup devices is supported, including HP, Exabyte, and jukebox devices. A Motif

GUI is provided for accessing files and directories for backing up and restoring. This feature, along with powerful scheduling capabilities, is intended to provide unparalleled ease of use.

Contact Innovus Inc., 200 James Street S., Suite 204, Hamilton, Ontario, Canada L8P 3A9, ph: (416) 529-8117.

Multimedia Interface

MediaMagic, Inc. has announced a modular multimedia interface for HP 9000 Series 700 workstations. The primary component is an EISA-compliant Base Video Board, designed to provide live, 24-bit, full-motion video. The modular design allows the addition of synchronized CD-quality audio and Joint

Photographic Expert Group (JPEG) compression. JPEG allows multimedia data transmission over a network and recording and playback from disk at rates exceeding 30 fps.

The Base Video Board operates independently and is designed to provide real-time, 24-bit, full-motion video; a standard window size of 640 x 480 at a 1-to-1 pixel replication rate; window sizes up to 1,020 x 908 through replication doubling; controls for video scaling and cropping, in addition to color and window adjustments; a capture feature for either single frames or sequential video clips; uncompressed frame capture rates of 4 to 9 fps at 640 x 480, and 14 to 30 fps at 320 x 240; support for the industry-standard file formats of TIFF, GIF, PPM, and JPEG; and a comprehensive, online, user-customizable help facility.

The Base Video Board includes video-in and video-out cables, a users guide, application software with software tools, and a one-year warranty on hardware, with 90 days of free software support. The Base Video Board supports HP 9000 Series 700s with an EISA option and HP-UX 8.07 or higher.

Contact MediaMagic, Inc., 222 Municipal Drive, Richardson, Texas 75080, ph: (214) 669-3408, fx: (214) 234-6280.

New from Vantive Corporation

Name Change

ProActive Software, Inc. has changed its name to The Vantive Corporation. The Vantive Corporation develops and markets the Vantive System, formerly known as the Customer Information Resource (CIR) system, a family of client-server applications that span the enterprise to help companies deliver superior service, product quality, and customer

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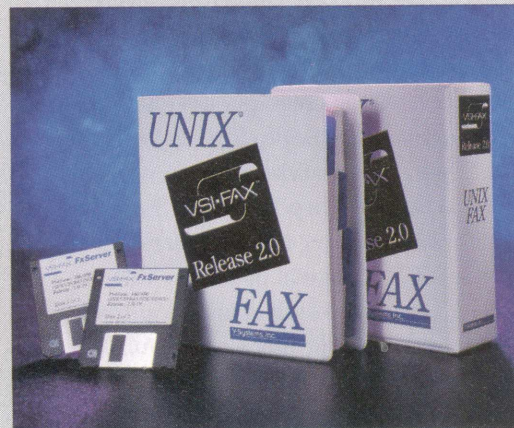
V-Systems, Inc. Phone: 714-545-6442 • FAX: 714-545-7653 • email: info@vsi.com

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Jeffrey A. Myers, Vice President, Midland Title Security

"VSI-FAX is an excellent product...a joy to use."
UNIX Review, November 1992

"We like the way VSI-FAX easily integrates with our applications. VSI-FAX requires little or no additional training for our employees and is easily administrated."
Dale Burley, MIS Director, Santa Cruz Operation



CIRCLE 55 ON READER SERVICE CARD

satisfaction. The Vantive System comprises five integrated applications—Vantive Support, Vantive Quality, Vantive HelpDesk, Vantive Sales, and Vantive Customer. These products were formerly called Support Advantage, Quality Advantage, HelpDesk Advantage, etc.

The new name, Vantive, unifies elements of the words ProActive and Advantage into one cohesive corporate and product identity.

The Vantive System also includes Vantive Tools, a set of application-specific customization tools, and Vantive OpenLinks, interfaces to third-party applications.

Vantive System 2.0

Release 2.0 of the Vantive System includes major enhancements to

applications and new core functionality. The product runs on HP 9000 servers.

The Vantive System comprises the five integrated applications noted above. It also includes Vantive Tools, a set of customization tools that require no changes to source code. All Vantive applications were developed in collaboration with Dr. William Davidow, co-author of *Total Customer Service* and a major investor in the company. These products share a common enterprise database and offer core functionality including advanced problem-solving help, workflow, and reporting.

The Vantive Quality application is designed to provide comprehensive quality assurance management for the entire product lifecycle. Vantive Quality is designed to help organizations comply with the ISO 9000 international quality

standards (companies apply ISO 9000 requirements as a step towards implementing a total quality management system). The product also monitors development phases, defines, and monitors quality objectives, manages configurations, controls changes and defects, validates product operations, tracks installations, maintains specifications and documentation, supports customers, and tracks resolutions and product releases.

Vantive Support, a support automation and call tracking application for low- to high-volume customer service environments, features added ease-of-use and a new set of support-specific workflow rules for improved call escalation and automatic notification.

Version 2.0 includes enhancements to the product's Workflow Manager,

Research Agent, and Report Manager, as well as expanded platform and third-party application support.

New Partnerships

The Vantive Corporation has embarked on two strategic reseller and joint marketing agreements with Oracle Corporation of Redwood Shores, California and Inference Corporation of El Segundo, California.

Under terms of the agreement with Oracle, Vantive Corporation is a Strategic Marketing Partner and Reseller of the ORACLE7 relational database. Vantive and Oracle will jointly market Vantive's client-server applications on ORACLE7 to Oracle's worldwide customer base.

Working with Inference, Vantive will integrate and resell Inference's CBR Express family of CASE-based retrieval products with the Research Agent. The alliance will deliver Inference's user interface to Research Agent users.

Upcoming New Products

The Vantive Corporation also unveiled new versions of two products—Vantive HelpDesk and the Vantive PhoneLink—that will be available by the end of 1993.

Vantive HelpDesk is designed to help companies support their own employees. Users can also send requests for information and automatically get responses, the company notes.

Vantive PhoneLink is a remote log-in capability designed to provide dial-up access to any Vantive application. With Vantive Phone Link, the network is transparent to the user and no network configuration is required, the company notes.

Contact The Vantive Corporation, 1890 N. Shoreline Blvd., Mountain View, California 94043, ph: (415) 691-1500, fx: (415) 691-1515.

Host-Based Printing

ColorSoft has announced a printer support and image editing package called OPENprint.

Users can now apply standard "lp" or "lpr" print commands to generically print raster images (GIF, SRF, PPM, WXD), HPGL, text, and PostScript documents from any UNIX-based system to virtually any printer. OPENprint is designed to turn a non-PostScript printer into a PostScript-compatible system that will support a minimum of 35 Adobe fonts. In addition, the product is said to significantly enhance raster imaging on PostScript devices. It also supports a broad range of file formats.

OPENprint is designed to provide cross-platform standardization, automated print-job interpretation, better looking image hard copy, X Window based previewing, editing and printer controls, and lower system cost. It is said to be the only solution of its kind to offer a standard printing architecture and user interface across all major UNIX platforms.

The software also supports output devices that include printers from Hewlett-Packard and most PostScript-compatible machines. A developers kit is also available.

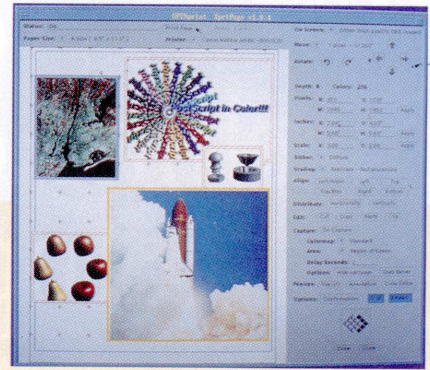
The product is designed to auto-sense various lpr'ed and lp'ed raster images and diffuse-dither them, avoiding the PostScript process altogether. The dithered image can then be automatically printed directly to a non-PostScript printer or converted into clean and fast PostScript code, the company notes. Non-PostScript printers will be able to print PostScript documents and still output raster images directly without unnecessary conversion, and PostScript devices will be able to print rasters in a way that eliminates the coarse, half-toned images produced using previous filters and programs.

The product also includes a suite of X Window based imaging tools. An on-screen WYSIWYG editor is designed to allow composing a page consisting of one or more images. Utilities are provided for color correction, control of brightness, sharpness, dithering, scaling, image, rotation, placement, text insertion, and more. The image(s) can then be saved in a printer or image specific format.

OPENprint also offers a tool for performing quick screen-capture printing, using all of the program's imaging controls and toggles for printer options.

The HP version is currently available and lists for \$700. OPENprint for Laser Printers is available for \$345. Each includes all of the on-screen utilities for every user on the network.

Contact ColorSoft, Inc., 7733 Herschel Avenue, Suite E, La Jolla, California 92037, ph: (619) 459-8500, fx: (619) 459-8274 or e-mail: colorsoft!sales@ucsd.edu.



ColorSoft's OPENprint

Multiplexer

DataComm for Business (DCB) has introduced a new multiplexer that attaches to the SCSI interface on UNIX systems, including HP 9000 Series 800s and 700s. The DCB UNImux is intended to eliminate wiring to a standard statistical multiplexer. Up to seven UNImuxes can be connected to a single SCSI interface and all the local multiplexer connections are made with one connection to the SCSI interface, the company notes. The UNImux communicates with an 8, 16, 24, or 32 channel DCB SR multiplexer at the remote location. Line speeds to 64 Kbps and terminal speeds to 19.2 Kbps are supported.

The UNImux is available in stand-alone or rack-mount versions. The rack-mount version installs in a DCB 3000 chassis. The 3000 chassis holds up to four multiplexers or DCB 1016 16-port local terminal servers. Configuration parameters loaded under UNIX are automatically downloaded to the remote multiplexer, the company notes.

The UNImux features a network management port with remote configuration, individual port configurations, loopbacks, test messages, and the DCB "Copy Command" for remote training and software support.

Contact DCB, 807 Pioneer, Champaign, Illinois 61820, ph: (217) 352-3207 or (800) 637-1127, fx: (217) 352-0350.

Class Libraries

PostModern Computing Technologies Corporation has announced the release of NetClasses 2.0, the successor to NetClasses 1.1. NetClasses is a set of C++ class libraries designed to allow application programmers to transport objects

over a network, set up fault-tolerant peer-to-peer TCP connections, and perform remote method invocation. According to the company, programmers can use C++ class library abstractions of TCP, UDP, and file I/O streams to communicate objects in connection-oriented, connectionless, and persistent object application domains.

PostModern's Distributed Service paradigm is a connection and service management mechanism organized so that network service providers do not have to set up explicit port numbers and remote procedure call connections. Rather, service providers simply "advertise" themselves on the network, the company notes. "Agents" are active processes on the network that monitor network service advertisements and manage connections between information producers and consumers. Servers advertise services and publish objects that will be received by clients subscribing to those services.

The developer can use the NetClasses or NIH base container libraries to organize objects as sets, ordered collections, linked lists, stacks, dictionaries, associations, and other abstract data types. The NetClasses "resource semantics" classes are designed to manage unpredictable object deletion using reference counts. Although 2.0 drops internal reliance on NIH classes, external NIH data is still supported in the new release. NetClasses 2.0 includes TCP- and UDP-based object transport mechanisms. The TCP and UDP facilities are all organized as C++ class libraries.

Contact PostModern Computing Technologies, Inc., 1032 Elwell Court, Suite 240, Palo Alto, California 94303-4309, ph: (415) 967-6169, fx: (415) 967-6212.

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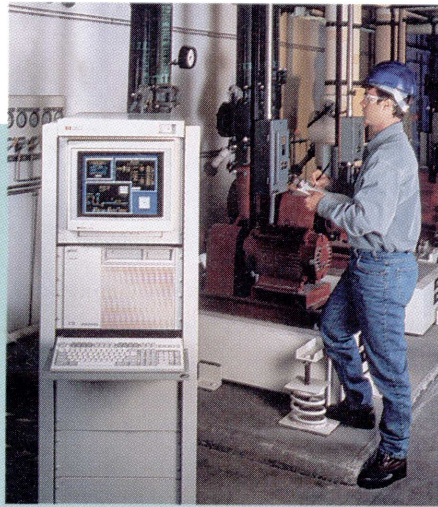
New From HP: Industrial Workstations

Hewlett-Packard has added two high-performance models to its industrial workstation family that double the performance of the current product line. Based on HP's 100-MHz implementation of the PA-RISC 7100 chip, the 745i/100 and 747i/100 extend the Series 700i into high-performance applications while offering the serviceability, connectivity, reliability, and versatile graphics of the 50-MHz Series 700i workstations introduced late last year. The Series 700i systems are completely modular, making them the most easily customized workstation solution from HP, the company notes.

The new 700i systems combine the PA-RISC-based architecture with world-class software-development tools to increase productivity. The systems can be configured to meet specific requirements such as ease of serviceability; standard rack-mount configurations; and application-specific I/O capabilities for factory-floor and real-time control, including VMEbus, IEEE 488, and EISA. HP will provide large-volume customers with DC power supplies for 24- and 40-volt mains.

The 700i workstations can withstand temperatures of minus 20 to 70 degrees Celsius, putting them in compliance with IEC65Spec requirements for environmental durability. (Office-grade workstations can withstand temperatures of zero to 40 C.)

The HP 9000 Models 745i/100 and 747i/100 double the random access memory (RAM) capacity to 256 MB and feature increased instruction/data cache of 256 KB/256 KB. The Models 745i/100 and 747i/100 offer performance levels of 140 SPECmark89, 77 SPECint92, and 144 SPECfp 92.



Industrial Workstation

The new 700i workstations run the HP-UX 9.0 operating system and are compatible with all Series 700 PA-RISC workstations. HP-UX is based on and is compatible with USL's UNIX System V Release 3 operating system. It also complies with X/Open's XPG3, POSIX 1003.1, and SVID2 interface specifications.

The 700i workstations feature a color graphic subsystem derived from the industry's price/performance leader, the Series 700 CRX graphics implementation, which is integrated on the CPU board.

The workstations support TCP/IP, ARPA/Berkeley, and Networked File Systems (NFS) services. The Series 700i workstations are equipped with Ethernet 802.3 hardware integrated on the CPU board. The standard AUI connector and an optional MAU are also available.

The product also features flexible rackmount package; three mass storage bays; enhanced environmental specifications; standard Ethernet, HIL, Audio, SCSI, dual RS-232, Centronics; expansible VMEbus or EISA/HP-IB; support for up to three multi-CRTs (on 747i); 16-256 MB SIMM RAM; 15-inch, 17-inch, or 19-inch color graphics; support for VME cards and one SGC (standard graphics connection) card (747i); and built-in capability for recording and playing back voice-quality sound.

The 745i/100 and 747i/100 are available now. Entry-level pricing for the HP 745i/100 is \$22,890. Entry-level pricing for the HP 747i/100 is \$26,490. Existing users of the Models 745i and 747i based on the 50-MHz implementation of the PA-RISC 7100 chip can upgrade to the 100-MHz model for \$10,500. Contact HP at (800) 752-0900 for more information.

Disk and Tape Drives

Parity Systems Inc. has announced high-capacity 3.5-inch disk and tape drives in space-saving enclosures for all major RISC-based workstations. These compact subsystems hold from one to four SCSI devices are designed for the desktop. Capacities for the disk drives range from 480 MB to 10.2 GB, 5400 and 7200 RPM performance, and 8 ms to 11 ms access/seek times. Tape drives

feature 2 GB and 2 to 8 GB data compression capacities.

Pricing is based upon quantity and capacity. The following is a range for the subsystems: PS7100 one-device subsystem, \$.85-\$2.17/MB; PS7200 two-device subsystem, \$.83-\$1.49/MB; PS7400 four-device subsystem, \$.81-\$1.45/MB; and the PS5600 portable, shock-mounted, one-device subsystem, \$.88-\$2.31/MB.

Contact Parity Systems, 110 Knowles

Drive, Los Gatos, California 95030, ph: (800) 514-4080 or (408) 378-1000, fx: (408) 378-1022, or e-mail inquire@parity.com.



New Products refers to numerous products by their trade names. In most cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

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HP-UX Resource Directory

The *HP-UX Resource Directory* serves as a complete resource guide for HP-UX users seeking answers. This is the industry's most comprehensive resource guide to products, services, and vendors. It will be devoted entirely to HP 9000 users operating in multi-user, workstation, and multi-system UNIX environments. This bi-annual directory, published each year in September and March, is a separate publication mailed out with *hp-ux/usr* magazine, the only HP-specific publication on the market.

Each company is listed by category, with each listing including company name, product, operating environment, and phone number. The cost for a full year listing in the

HP-UX Resource Directory is \$475. Discounts are available for current advertisers in *hp-ux/usr*, *Interact* or the *Vendor Service Source Directory*. Advertisers who run more than one listing per issue also receive a discount. There is a 75-word maximum per listing, with a charge of \$1.00 per word over the maximum.

The next Interex *HP-UX Resource Directory* will be published in **March 1994** with all listings due by **December 10, 1993**. For further information contact Liana Fisher at the Interex Advertising Department (408) 747-0227 or (800) 468-3739. Fax: (408) 747-0947. Written inquiries should be addressed: Liana Fisher, Interex, 1192 Borregas Avenue, P.O. Box 3439, Sunnyvale, California 94088-3439 U.S.A.

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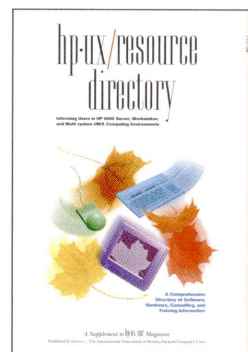
Other categories may be created as needed. See reverse side for listing form.

HP-UX Resource Directory

SPRING 1994 LISTING FORM

The Interex *HP-UX Resource Directory* is published two times a year and mailed with *hp-ux/usr* magazine. **The cost for a single listing in two issues is \$475.** Each additional listing is \$375. Discounts are available for current advertisers in *hp-ux/usr*, *Interact*, or the *Vendor Service Source Directory*. For additional listings, please duplicate this form. The maximum number of words per listing is 75, excluding company name, address, product name, and operating environment. There is a charge of \$1.00 per additional word for each listing. The next *HP-UX Resource Directory* will be published in **March** with all listings due by **December 10, 1993.**

Company logos can be placed with listings. The cost is \$100, with discounts available for multiple listings. Maximum size is 3/4 inches high by 1-1/2 inches wide.



Fall 1993 HP-UX
Resource Directory

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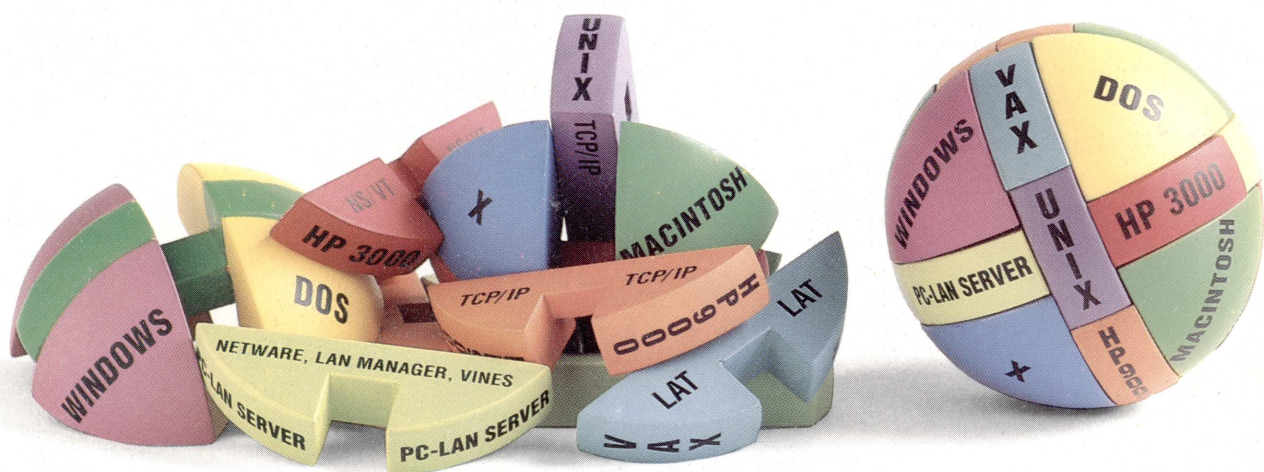
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